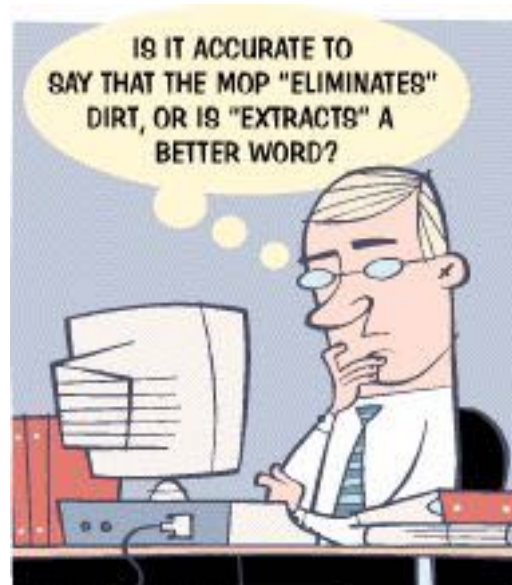


Technical Communication

Session 1

Introduction to the Principles of Effective Technical Writing



Objectives

- The course will help you develop an awareness of
 - what academic writing is or what scientific writing is.
 - inform you of some core writing strategies that will enable you to prepare
 - address the importance of plagiarism along with importance of research ethics and scientific conduct
 - let you know the principles of effective technical communication
 - ability to say something with clear logical progression of thoughts
 - cutting down on clutter
 - simplify obscure sentences to communicate with clarity of expression

Objectives

This course will help you engage with the techniques and strategies of effective technical

- in approaching to a topic, a text, or ideas through reading, evaluating, and analysing, and writing scientific papers,
- making the research pitch, organising sources, in the correct/required format, drafting abstracts, short reports, and reviews.
- present through properly designed posters/powerpoint presentations.
- critically engage with your own writing, make editorial changes, while making follow up drafts, and also objectively participate in peer-reviewing
- apply the strategies of effective communication to a. engaging in formal means of written communication including emails for specific official purposes
- conducting and documenting other formal write ups like making resume,
- drafting academic cover letters,
- and basics of research proposals,
- and statement of purpose for their research projects/ideas

Introduction

- Good writing
 - Communicates an idea clearly and effectively
 - The content has something to say
 - There is clear thinking and a logical progression of arguments
 - Needs to be well organised and structured
 - Time, patience, revisions, multiple drafts, and good editing - these are the requirements to write well

Introduction

- A good writer must have:
 - Clarity of ideas, should be aware what s/he wants to write
 - Must have some patience to keep working on it and perseverance to seek for good writing techniques
 - Open-mindedness to learning, and the capability to accept your mistakes and work on them
 - Strict editing is a must and throwing away of the excess words/ repetitions etc
 - You need to learn steadily
 - its an acquired ability, a skill that can be learned through practice

Some basic principles

Rules of scientific writing that you should always keep in the back of your mind whenever you get down to writing your research paper.

Be clear, precise and focused as much as possible without sacrificing the meaning of your writing.

Keep your sentences and paragraphs reasonably short.

Remember less is more, avoid unnecessary jargon, use personal pronouns I and we for self-promotion in the international academic community.

Frame and contextualise whatever you are writing, and always let your reader know what you're writing about and why you're writing about this.

Define all your terms, the moment you first mentioned them. Simplicity is the heart of efficient scientific writing.

The secret of good writing is to strip every sentence to its clearest component.

What is not to be done

- Avoid starting with lengthy generalisations, be specific
- The simpler the better, there is no need to be verbose or superfluous
- One idea per paragraph should be the ideal way
- Rephrase for brevity and being focused
- These are some of the things that you should avoid in writing:
 - Redundancies, modifiers, adverbs and adjectives, long words, sophisticated words
 - Words that have no meaning or little meaning, words that do not add any ideas to your content.

Clarity, Precision, and Accuracy

State your facts as simply as possible

the precision comes from selection not from compression.

There are different strategies how you can compress your paper, how you can make it condensed. Prune and shake is excellent advice.

You have to decide what you do not need to say and then don't say it and that's the prune the big limbs part.

The next step is to decide what words you do not need in your paper, what ideas or concepts you do not need to present in your paper.

For this, you need to build up a good story frame. A broken frame is inefficient.

When you present your ideas in different places in your paper, you always repeat things, which is not very good thing in scientific writing.

When your paper is compact and condensed, then you decide what words you can get rid of, what words you can do without.

Avoiding Hedge

Hedge, or hedging mean taking both sides, thus taking no chances of absolute failure

words as I would like, I would suggest, I would try, modal verbs like could, might

So if you say this might mean, or these findings might mean this, this, or that, then you demonstrate,

you clearly demonstrate that you're only 50% sure of what you're writing

For example:

I would suggest this theory or this methodology from my research.

Why not just write I suggest, and

be more confident of what you're writing or for example

Hidden Negation

It is a style problem that creates wordiness, and bring twist and perplexity for readers, involves negation or negative phrasing

Negative statements do not always involve the fundamental negative words, not, no, never, or even there are similar negative word parts, such as un-, il-, ir-, dis- or -less

There are many other words with negative meaning, and some of them are not obviously negative at all

Avoid negative sentences as affirmative sentences are clearer, more condensed and precise

Active/Passive voice

- People often use the passive voice
 - it's indirect, polite, unaggressive, and lack of direct agency
- Active voice is clear, concise, and direct
- It is also visible and evocative
- You can see the doers of the action because they're named up front, and you can visualise the action because it is carried in a verb that follows immediately the subject
- The passive voice makes the reader work harder than necessary. Doing the harder work tires the reader
- Converting the passive voice to the active voice calls for the writer to put the true subject first

Active/Passive voice

Example 1

Active: Volatile organic compounds (VOCs) emitted from industries and vehicle exhausts can induce a series of environmental problems, including photochemical smog, broken ozonosphere, and environmental pollution.

Passive: A series of environmental problems, including photochemical smog, broken ozonosphere, and environmental pollution, can be induced by volatile organic compounds (VOCs) emitted from industries and vehicle exhausts.

Example 2

Active: This study develops an efficient methodology to examine a space–time continuous dataset for urban irrigation water use.

Passive: An efficient methodology to examine a space–time continuous dataset for urban irrigation water use is developed in this study.

Tenses in scientific writing

Why are tenses important in science writing or are they important in science writing?

When you write a scientific paper you need to choose which tense or tenses to use.

Because depending on the field of your science,

- depending on the type of your research paper,
- so whether it is a technical report or review article,
- whether it is an original research paper or a review paper,
- then you will choose this or that tense

Tense that you use in your paper shows your reader very specific information

It is really crucial for an effective scientific writing.

In science writing, there are three basic tenses that are most often used.

present simple tense, the simple past tense, and the present perfect tense

Tenses in scientific writing

So let's consider the following example.

- The work demonstrated the use of XPS to characterise the chemistry of materials.

In this case the past simple tense is used and it demonstrates that the research was completed and you just state this past event.

So if you write the same sentence using the present perfect tense,

- The work has demonstrated a new use of XPS to characterise the chemistry of materials, you show that the research is still in progress.

Three tense forms, either active words or passive words make up the bulk of all verbal patterns forms in academic writing.

The present simple tense just 70%, the past simple tense 23% of all the tense forms. And the present perfect tense is about 5%.

Tenses in scientific writing

The present simple tense is used in the introduction to report what we already know, and we report the topic of the research.

When you use the present simple tense in the conclusion, then you use it to transmit information that has become known and you say it is now known.

So we use the present simple tense in the conclusion to say that, now you know that this fact is relevant or this fact is important, this information is crucial.

In addition, the present simple tense is used in a research paper just to make a general statement, conclusion, or interpretation of previous studies or data refocusing on what is now known.

Besides, we use the present simple tense to express the consent with the other authors, with the other writers, with the other researchers.

We show our agreement with the previous studies.

- We recognise their achievements or some scientific truths
- The present simple tense is used to describe what the article is about and we demonstrate the consistency with overall results presented in the previous article

Tenses in scientific writing

The past simple tense is used to write about a special study implemented by a well known scientist

It is also used to describe methods and data of the completed study

Verbs are used in the passive voice in the description of methods and processes

Verbs are used in the past simple tense in passive voice just to demonstrate the details of our experiment

and, to show that we did something while carrying out the experiment

Tenses in scientific writing

So using the present perfect tense,

you show to your reader that the results of the previous studies to date are relevant.

to summarise the results of studies carried out previously

- And thus you say, researchers have found, studies have suggested.
- We also use the present perfect tense to indicate the connection with the previous studies
- Something has been done so far.

We'll also use this tense to indicate the connection of the previous studies,

- what has been done,
- to those that are currently underway,
- in how you will be contributing and how these findings will be contributing to your research.

Punctuation

Punctuation serves a crucial function in English.

In writing, punctuation substitutes all the messages that the spoken word can convey through intonation, gestures, humour, pitch, volume.

The absence or presence of a comma in the particular position can not only change the meaning of the sentence, it can sometimes reverse the meaning.

In other words the absence of a comma tells the reader that more than one of a certain thing exists in the context of a sentence.

Whereas the presence of a comma in that same place will tell the reader that only one of that thing exists for that context.

What would you ask?

- So, is this sentence easy to understand?
- Can I pin point what it is trying to communicate?
- Is it too lengthy or too brief?
- Are things properly explained in clear terms?
- Is this sentence interesting to read?
- Does it lead to the next point?
- Is the sentence written to inform?
- Is it too abstract or there is some conceptual clarity?

Type of Evaluation	% Contribution in Grade
(a) Review essay (group)	25
(b) Summary (individual; in class)	30
(c) Poster (Group)	25
(d) Class Test (Individual; in class)	20
Total	100

Technical Communication

Session 2

Communicating Scientific ideas clearly: From Clutter to Clarity

Characteristics of good scientific writing

Scientific writing is about communicating ideas.

Characteristics of good scientific writing

Good scientific writing is:

- **clear** - it avoids unnecessary detail
- **simple** - it uses direct language, avoiding vague or complicated sentences. Technical terms and jargon are used only when they are necessary for accuracy
- **impartial** - it avoids making assumptions (Everyone knows that ...) and unproven statements (It can never be proved that ...). It presents how and where data were collected and supports its conclusions with evidence;

Characteristics of good scientific writing

- **structured logically** - ideas and processes are expressed in a logical order. The text is divided into sections with clear headings
 - **accurate** - it avoids vague and ambiguous language such as about, approximately, almost
 - **objective** - statements and ideas are supported by appropriate evidence that demonstrates how conclusions have been drawn as well as acknowledging the work of others.

Choosing the words

To make your writing clear, accurate and concise you should consider carefully the words that you use, and the ways in which you use them.

Technical terms

In most scientific writing you will need to use some scientific or technical terms in order to be clear and unambiguous. However, use such terms only when you need to do so and do not try to impress the reader by using unnecessary technical jargon or lengthy words.

Abbreviations

Abbreviations can be a very useful way of saving time and avoiding repetition, but they can be confusing and might not be understood by everyone. Use standard abbreviations where these exist, and reduce your use of abbreviations to an absolute minimum; they are rarely essential.

Choosing the words

Use objective rather than subjective language

Objective language is language that is impartial and states a fact or process; subjective language is open to question or interpretation as it implies personal thought or belief.

For example:

objective *The car travelled at 38 kilometres per hour*
is a clear, objective statement of fact.

However:

subjective *The contents of the test tube turned a beautiful blue colour*
uses *beautiful* in a way that is subjective because it cannot be measured or accurately explained to the reader. Always use language that is concrete and specific rather than vague and personal.

Choosing a 'voice'

Scientific writers have a tendency to use *passive* rather than *active* expressions;

stating that *a* was affected by *b* uses the passive voice while stating that *b* did something to *a* uses the active voice.

The following example shows a sentence written in both the passive and active voices.

passive *The experiment was designed by the research officer*

active *The research officer designed the experiment*

The passive voice is particularly useful when:

- you wish your writing to be formal and depersonalised:

passive *It was agreed that the experiment should be...*

active *We agreed that the experiment should be...*

- information about the agent is obvious or unimportant

Choosing a 'voice'

passive *Extra solvent was added to the flask*

active *The technician added extra solvent to the flask;*

- you do not know the identity of the agent:

passive The water pipe was broken in three places

active Something/someone had broken the water pipe in three places

However, the use of the passive voice can lead to clumsy and overcomplicated sentences.

passive Difficulty was experienced in obtaining the product in a high state of purity
is rather convoluted way of saying

active The product was difficult to purify

which is a much clearer and more straightforward statement.

In general, the active voice is clearer, more direct and easier to read, but the passive voice can be more appropriate in particular circumstances.

What is most important is for you to be aware of how you are writing, and how the voice that you choose affects the tone and the meaning of your words.

Weak intensifiers

Avoid using “very, interestingly, strikingly, new, novel, excitingly...”

Only the content itself can be interesting, striking, or novel.

Editorialising

—proclaiming your opinion that something is interesting or whatever only invites skepticism.

Annoying intensifiers can also have an emotional coloration, as in

“I deeply believe in the importance of cancer research”.

Imposing your emotions on others in a professional context is manipulative

Personal or impersonal?

Scientific writers often try to avoid the use of personal expressions or statements in order to make their writing seem more impartial and formal. The following sentence has been written with both personal and impersonal expressions to highlight the contrast between the two writing styles.

impersonal - The explanation for this phenomenon may be found in...

personal - We/I believe that the explanation for this phenomenon may be found in...

For example:

impersonal & passive

It was decided that the temperature should be raised gives no information about the identity of the people who made the decision.

Personal or impersonal?

However, used indiscriminately, writing impersonally can result in clumsy statements through an excessive use of the passive voice. This can lead to ambiguity or inaccuracy in your written work.

personal & active

We decided that the temperature should be raised avoids ambiguity and makes the sentence sound more direct, but uses the personal and rather informal ‘we’.

impersonal & active

The research team decided that the temperature should be raised is clear and direct.

Think carefully about your use of impersonal and personal expressions, taking care to ensure that your writing is always clear and unambiguous.

Gender biased sentences

As an example, here is a gender-biased sentence:

“Every student should decide what he thinks is best for his own education in biology”.

One approach is to use the gender-neutral third person plural:

“Every student should decide what they think is best for their own education in biology”.

In some cases switching to the second person can also side-step sexist usage:

“Each student should decide what you think is best for your own education in biology”.

Sentence length

Sentences that are too short and poorly connected can be irritating to read.

Conversely, sentences that are too long and rambling are difficult to follow and are likely to be confusing.

Use a sentence length that allows your thoughts to flow clearly. As a general rule there should be no more than 20-25 words in any one sentence.

You may be able to reduce your sentence length by:

- cutting out unnecessary words
like might replace *along the lines of*
now may be just as appropriate as *at the present time*

Sentence length

We can now turn our attention to could perhaps be cut out entirely;

- dividing complex sentences into separate phrases or sentences.

If a breakdown occurs it is important that alternative supplies are available and the way that this is done is for the power stations to be linked through the high voltage transmission lines so that all of them contribute to the total supply of energy and an unexpectedly large demand can be handled.

It can be re-written thus:

If a breakdown occurs it is important that alternative supplies are available; this is done by linking power stations through the high voltage transmission lines. All of them thus contribute to the total supply of energy and an unexpectedly large demand can be handled.

Clauses...

Please do not start sentences with long modifying clauses.

Here is an example:

“Using phosphorescence imaging as a form of biological oximetry, we confirm the oxygen poor environment of the gut lumen and demonstrate the existence of a dynamic equilibrium with an established gradient whereby the mammalian gut releases oxygen into the gut lumen”.

A reader will likely need to read the sentence several times to get the meaning.

The much shorter revision below, which lacks the modifying clause, captures most of the content:

“We used phosphorescence imaging to characterise oxygen gradients in the gut lumen and found higher levels near the gut wall”.

How to deal with a sentence?

Here is a sentence from a paper on the growth of carbon nanotubes.

“These results suggest that it would be fundamentally difficult to achieve a fast growth with a long lifetime.”

Here is the sentence without “fundamentally”?

“These results suggest that it would be difficult to achieve a fast growth with a long lifetime.”

There is no difference in meaning between “difficult” and “fundamentally difficult”.

The two sentences differ in that the first contains a useless word of five syllables.

How to deal with a sentence?

The sentence also has other problems

—the authors should have written “fast growth rate” instead of “a fast growth”, or still better something more specific.

Always delete “fundamentally” from your writing.

Similarly, delete “certainly” and “basically”.

“Basic” is fine when it means high pH, but not when interchangeable with “fundamentally”.

Scrutinize your prose for additional words that add nothing and can be deleted.

Rephrase for brevity

Editing is hard work. Below are three before-and-after examples.

The first is a wordy paragraph

1) Original: “Much interest has centered on the question of whether host proteins are important for the function of PICs in vivo. This article will first review proposals for important proteins arising from studies of PICs, then review studies employing reactions with purified integrase. Proteins thought to influence integration by binding target DNA will be considered in a following section”. (58 words)

Here is a version rephrased for brevity that is also more accurate.

“Are host proteins important for the function of PICs? Below I review proposals derived from in vitro studies of PICs, purified integrase, and purified target DNA binding proteins”. (28 words)

Rephrase for brevity

2) Original: “A wide variety of factors influence the success of treatment of multiple human cancers.” (14 words)

Rephrased: “The success of cancer therapy is affected by multiple factors.” (10 words)

3) Original: “Based on data presented here and the published literature (21-23), we propose a model in which HIV can exploit binding to multiple cell surface proteins to enter cells efficiently.” (29 words).

Rephrased: “Evidently HIV can bind multiple cell surface proteins to facilitate entry (this work and 21-23)”. (15 words).

Rephrase for brevity

"A robust cell-mediated immune response is necessary, and deficiency in this response predisposes an individual towards active TB."

Notice how the two parts of this sentence actually say the same thing. One part says it's necessary, the other part says Is that bad things will happen if you don't have it. So we can convey the same idea here by just saying,

"Deficiency in T-cell-mediated immune response predisposes an individual to active TB."

- It is of considerable importance to ensure that under no circumstances should anyone fail to deactivate the overhead luminescent function at its local activation point on their departure to their place of residence, most notably immediately preceding the two day period at the termination of the standard working week.
- Always turn the lights out when you go home, especially on a Friday.

- The clearest available example of such Western epistemic violence is the remotely orchestrated, far-flung, and heterogeneous project to constitute the colonial subject as Other.
- Western discourses have intentionally made the colonial subject as other.

So,

- Complex ideas might not require complex language
- Scientific writing can also be easy and enjoyable to read

- “These findings imply that the rates of ascorbate radical production and its recycling via dehydroascorbate reductase to replenish the ascorbate pool are equivalent at the lower irradiance, but not equivalent at higher irradiance with the rate of ascorbate radical production exceeding its recycling back to ascorbate”
- These findings imply that, at low irradiation, ascorbate radicals are produced and recycled at the same rate, but at high irradiation, they are produced faster than they can be recycled back to ascorbate.

- This paper provides a review of the basic tenets of cancer biology study design, using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research.
- This paper reviews cancer biology study design, using examples that illustrate specific challenges and solutions.

- As it is well known, increased athletic activity has been related to a profile of lower cardiovascular risk, lower blood pressure levels, and improved muscular and cardio-respiratory performance.
- Increased athletic activity is associated with lower cardiovascular risk, lower blood pressure, and improved fitness.

- The experimental demonstration is the first of its kind and is a proof of principle for the concept of laser driven particle acceleration in a structure loaded vacuum.
- The experiment provides the first proof of principle of laser-driven particle acceleration in a structure-loaded vacuum.

- Brain injury incidence shows two peak periods in almost all reports: rates are the highest in young people and the elderly
- Brain injury incidence peaks in the young and the elderly

Basic Principles of effective technical writing

- Content and Context
- Who is your audience?
- Style guide
- Writing Style
- Accessing information
- Grammar
- Be careful not to plagiarise

Basic Characteristics of technical writing

- Keep it to the point
- Clarity and conciseness
- Choose exactly what you need to say
- How can you best express them
- Create a scheme

Avoid Clutter



Technical Communication

Session 3

How to read a scientific paper?

Introduction

- Why should researchers must read papers?
 - to re-view them for a conference or a class,
 - to keep current in their field,
 - or for a literature survey of a new field.
- A typical researcher will likely spend hundreds of hours every year reading papers.
- Learning to efficiently read a paper is a critical but rarely taught skill.
- At the initial stage, students, therefore, must learn on their own using trial and error.
 - However, students tend waste much effort in the process and are frequently driven to frustration.

The ‘three-pass’ approach

- The key idea is that you should read the paper in up to three passes,
 - instead of starting at the beginning and plow-ing your way to the end.
- Each pass accomplishes specific goals and builds upon the previous pass:
- The first pass gives you a general idea about the paper.
- The second pass lets you grasp the paper’s content, but not its details.
- The third pass helps you understand the paper in depth

The first pass

- The first pass is a quick scan to get a bird's-eye view of the paper.
- You can also decide whether you need to do any more passes.
- This pass should take about five to ten minutes and consists of the following steps:
 - 1. Carefully read the title, abstract, and introduction
 - 2. Read the section and sub-section headings, but ignore everything else
 - 3. Read the conclusions
 - 4. Glance over the references, mentally ticking off the ones you've already read

The first pass

At the end of the first pass, you should be able to answer the five Cs:

1. Category:

- What type of paper is this?
- A measurement paper?
- An analysis of an existing system?
- A description of a research prototype?

2. Context:

- Which other papers is it related to?
- Which theoretical bases were used to analyse the problem?

3. Correctness: Do the assumptions appear to be valid?

4. Contributions: What are the paper's main contributions?

5. Clarity: Is the paper well written?

The first pass

- Using this information, you may choose not to read further.
 - This could be because the paper doesn't interest you,
 - or you don't know enough about the area to understand the paper,
 - or that the authors make invalid assumptions.
- The first pass is adequate for papers that aren't fully in your research area/interest, but in some way might be relevant.
- Take care to choose coherent section and sub-section titles and to write concise and comprehensive abstracts.
- Note, it might be that:
 - If a reviewer cannot understand the gist after one pass, the paper will likely be rejected;
 - if a reader cannot understand the highlights of the paper after five minutes, the paper will likely never be read.

The second pass

- In the second pass, read the paper with greater care, but you can ignore details such as proofs.
- It helps to jot down the key points, or to make comments in the margins, annotate as you read.
- Look carefully at the figures, diagrams and other illustrations in the paper.
- Pay special attention to graphs. Are the axes properly labeled?
- Are results properly analysed? Are the conclusions significantly made?
- Common mistakes like these will separate good, quality research papers from rushed, shoddy work from the truly excellent.
- Remember to mark relevant unread references for further reading (this is a good way to learn more about the background of the paper).

The second pass

- The second pass should take up to an hour.
- After this pass, you should be able to grasp the content of the paper.
- You should be able to summarise the main thrust of the paper, with supporting evidence, to someone else.
- This level of detail is appropriate for a paper in which you are interested, but does not lie in your research speciality.
- Sometimes you won't understand a paper even at the end of the second pass.
- This may be because the subject matter is new to you, with unfamiliar terminology and acronyms.
- Or the authors may use a proof or experimental technique that you don't understand, so that the bulk of the paper is incomprehensible.

The second pass

- The paper may be poorly written with unsubstantiated assertions and numerous incoherent references.

You can now choose to:

- (a) set the paper aside, hoping you don't need to understand the material to be successful in your career,
- (b) return to the paper later, perhaps after reading background material or
- (c) persevere and go on to the third pass.

The third pass

- To fully understand a paper, particularly if you are reviewer, requires a third pass.
- The key to the third pass is to attempt to virtually re-implement the paper:
 - that is, making the same assumptions as the authors, re-create the work.
- By comparing this re-creation with the actual paper, you can easily identify not only a paper's innovations, but also its hidden failings and assumptions.

The third pass

- This pass requires great attention to detail.
- You should identify and challenge every assumption in every statement.
- Moreover, you should think about how you yourself would present a particular idea.
- This comparison of the actual with the virtual
 - Lends a sharp insight into the proof and presentation techniques in the paper
 - You can very likely add this to your repertoire of tools.

The third pass

- During this pass, you should also jot down ideas for future work.
- This pass can take about four or five hours for beginners, and about an hour for an experienced reader.
- At the end of this pass,
- You should be able to reconstruct the entire structure of the paper from memory,
 - as well as be able to identify its strong and weak points.
- In particular, you should be able to pinpoint implicit assumptions,
 - missing citations to relevant work,
 - and potential issues with experimental or analytical techniques.

Doing a literature survey

- Paper reading skills are put to the test in doing a literature survey.
- This will require you to read tens of papers, perhaps in an unfamiliar field.
- What papers should you read?

Doing a literature survey

- Here is how you can use the three-pass approach:
- First, use an academic search engine such as Google Scholar and some well-chosen keywords to find three to five recent papers in the area.
- Do one pass on each paper to get a sense of the work, then read their related work sections.
- You will find a thumbnail summary of the recent work, and perhaps, if you are lucky, a pointer to a recent survey paper.
- If you can find such a survey, you are done.
- Read the survey, congratulating yourself on your good luck.

Doing a literature survey

- Otherwise, in the second step, find shared citations and repeated author names in the bibliography.
- These are the key papers and researchers in that area.
- Download the key papers and set them aside.
- Then go to the websites of the key researchers and see where they've published recently
- That will help you identify the top conferences in that field because the best researchers usually publish in the top conferences.

Doing a literature survey

- The third step is to go to the website for these top conferences and look through their recent proceedings.
- A quick scan will usually identify recent high-quality related work.
- These papers, along with the ones you set aside earlier, constitute the first version of your survey.
- Make two passes through these papers.
- If they all cite a key paper that you did not find earlier, obtain and read it, iterating as necessary.

Ways to use the three-pass technique

- You can use this approach to read conference proceedings, write reviews, do background research, and to quickly review papers before a discussion.
- This disciplined approach might prevent you from drowning in the details before getting a bird's-eye view.
- It might help you to estimate the amount of time required to review a set of papers.
- You can adjust the depth of paper evaluation depending on my needs and how much time you have.

Questions to ask

What is the main idea proposed in the research paper?

What exactly are the authors trying to answer with their research (objectives)?

Does the topic title justify the research done?

What have the authors done to answer the specific question/s (methodology)?

Does the result seem to echo the main claim of the paper? Do you agree with them?

Do the authors identify any limitations in their own study? Do you see any that the authors missed?

What do they propose to do as a next step? Do you agree with that (any indications for future research)?

Who are the (acknowledged or self-proclaimed) experts in this particular field?

What type of paper is this? What are the paper's main contributions? Is the paper well written?

Where is it published? Peer-reviewed?

Academic Summary

Technical Communication

Week 4

03.09.2025

An academic summary is a concise, succinct representation of an academic text such as a scholarly book, journal article, and research report.

The main purpose of summaries:

enable the reader in a limited time to determine why a paper, a journal article, a book chapter or a book is worth reading.

readers can briefly understand the contents of a journal to then become a consideration of whether it is appropriate for what the reader is looking for

researchers can state what the crux, major points of the document

A summary is a shortened or condensed version of a reading.

- Only includes the most important concepts or ideas
- Used to explain the content of the reading to someone who has not read it
- Written in your own words with a minimal use of direct quotes.

Academic summary is sometimes confused with abstract

Why?

An abstract is a brief representation of the aim, method, main results and conclusions of the study,

whereas an academic summary typically shows the (argumentation) structure of the text, i.e. the skeleton of the arguments

What do you need in a summary?

- Accuracy
 - Did you report the author's ideas accurately?
- Completeness
 - Did you include all the key points or main ideas?
- Emphasis
 - Did you replicate the importance the author placed on certain ideas?
- Readability
 - Did you write it in an easy-to-understand paragraph form?
- Your Own Words
 - Did you mostly use your own words and put all of the author's words in quotation marks?

Reading for a Summary:

To write a summary, you need to understand the reading and its main ideas.

This will include (remind yourself the three pass technique):

1. The overall main idea
2. Paraphrase it in your own words
3. Consider the sections into which the paper is divided
4. Identify the sections or divisions that the author used to organise the work
(similar to making an outline for the reading)
5. Include the author's key points.
(Take note of what the author used to support his/her statements, e.g., the most important examples, arguments, statistics, expert opinion, etc)

Create an Outline:

Writing a summary is much easier to do from an outline, which will also provide you a writing plan for your summary.

- At the top of the outline, write the main idea/concept.
- Make an outline of the supporting ideas you would like to include in the summary.

The summary must be written in flowing text.

You should not take words exactly from the source text or the original text.

must also be easily understood and should not deviate in meaning from the original text

Writing an academic summary has various functions and uses for example to help students facing exams and to prepare for a discussion.

In this course, the assignment of making summaries of journal articles is to prepare for an academic work.

You are expected to be able to quickly penetrate the structure and core ideas of a paper/article and to express them concisely in the your own words

The academic summary may serve **three functions**:

- Explaining a text: intended to explore the text types, the main themes, and the theoretical frameworks; focuses on the general content (annotated bibliography).
- Replacing a text: extracts the most important (sub)themes of a text based on a well-considered selection (extract, exam preparation, reading report)
- Discussing a text: a critical report with a substantiated final conclusion (review, essay, final paper, preparation for a group discussion)

Three Tips for Writing a Summary:

- In the first sentence, identify the author, the title of the work, and the thesis statement.
- Write in paragraph form with clear transitions between major points.
- You might choose to organise the ideas in the same order as the original.

What to Avoid when Writing a Summary:

- Repetition of similar ideas.
- Minor details (e.g., examples, anecdotes, descriptions, statistics, and dialogue).
- Direct quotes (unless there is no other way to give the information).
- Digressions from the main points.
- Your own personal opinions or comments on the subject are not welcome.

The format of an academic summary is nearly always the same. A summary of a research report in the form of journal article must contain information on the components mentioned in the table below.

Research question/problem statement

A well-written summary will reveal research questions or problems in the topic that the author will clearly explain, answer, or argue in the text.

What issues are being studied?

What kind of problems does the author really want to address?

On the basis of which specific case did the author do that?

Method

In this section, you will explain how the investigation has been carried out.

Only state the outlines; there is no need to explain in full detail.

Deliver a concise description of how the investigation has been generated, analysed and interpreted by means of a scientifically proven method.

Keep to the most important aspects, such as the structure of the most important data and the method used in the analysis.

Results/arguments

In this section you should process the outcome of the investigation.

Do not mention all findings in the summary; narrow it down to the most important findings or arguments relevant for answering the research question or supporting the main thesis.

Any unexpected outcomes are to be mentioned as well.

Motivation/relevance

In this section of the summary you will answer the question why this investigation has been conducted.

The research question or the definition of the problem statement is connected to an issue that is of importance to the author, either in a social or academic context.

What is the author's motivation?

What gap is the research text trying to fill?

Theoretical framework

You must be careful of the framework within which the investigation has been conducted.

From which theoretical perspective has the author approached the issue?

Which scientific theories or models does the author use as starting point to describe, analyse, interpret and explain the issue?

Conclusions

The research question has to be answered in this part of the academic summary.

You are not allowed to submit any new information.

Do not include your opinion unnecessarily

Understanding Scientific Misconduct and Ethics in Research and Publication

Technical
Communication

Week 6

17.09.2025

- Part 1: Ethics in Research and Publication
- Part 2: Paraphrasing, summarising and quoting

Part 1: Ethics in Research and Publication

Preface

- The importance of ethical conduct and its awareness is relevant, whether:

You are just starting out in your career

or

You are a more seasoned researcher

- Plagiarism, research fraud, undisclosed competing interests

Just a few of the issues that can threaten not only the integrity of the science,

but

Also one's standing in the scientific community

Preface

- An understanding of the ethical boundaries and "rules" is paramount
to ensuring your work and career get off to the best start possible
- It is with this in mind that the enquiry into Ethics in Research & Publication
is relevant for both early-career researchers

Overview

- Authorship
- Competing Interests
- Plagiarism
- Simultaneous submission
- Research fraud
- Salami Slicing

Authorship

- Naming authors on a scientific paper ensures
that the appropriate individuals get credit
and are accountable for the research
- Deliberate misrepresentation of a scientist/researcher's relationship to their work
is considered to be a form of misconduct that undermines confidence in the reporting of the work itself
- While there is no universal definition of authorship,
an “author” is generally considered to be an individual who has made a significant intellectual
contribution to the study

Authorship

Four criteria must all be met to be credited as an author:

- Substantial contribution to the study conception and design, data acquisition, analysis, and interpretation.
- Drafting or revising the article for intellectual content.
- Approval of the final version.
- Agreement to be accountable for all aspects of the work related to the accuracy or integrity of any part of the work.

Authorship

- The following are some general guidelines, which may vary from field to field:
 - The order of authorship should be "a joint decision of the coauthors".
 - Individuals who are involved in a study but don't satisfy the journal's criteria for authorship, should be listed as "Contributors" or "Acknowledged Individuals"
 - Examples include: assisting the research by providing advice, collecting data as assistants paid for their services, providing research space, departmental oversight, and obtaining financial support.
 - For a large team, it is typically published, along with a statement of the individual contributions made.
 - Some groups list authors alphabetically, sometimes with a note to explain that all authors made equal contributions to the study and the publication.

Authorship

Three types of authorship are considered unacceptable:

- "Ghost" authors, who contribute substantially but are not acknowledged (often paid by commercial sponsors);
- "Guest" authors, who make no discernible contributions, but are listed to help increase the chances of publication;
- "Gift" authors, whose contribution is based solely on a tenuous (negligible) affiliation with a study

Authorship

- When not appropriately addressed, authorship issues can lead to dispute.
 - Some disputes are based on misconduct (such as lying about one's role);
 - Some stem from questions of interpretation, such as the degree to which a person's contribution can be considered "substantial," and if authorship is justified.
- Other potential issues could include:
 - being involved in a study, but not listed as an author or contributor;
 - someone taking your idea and publishing a paper claiming full authorship;
 - and finding your name on a publication without your permission.
- If a complaint is filed over a dispute,
 - an investigation may be conducted with the journal editor and author's institution to reach a resolution.

Authorship

- Because of the potential for ambiguity and confused expectations,
 - it is strongly advised that before the research begins,
 - a meeting take place to document how each person will be acknowledged.
- Issues around authorship can be complex and sensitive
 - Early career researchers who encounter such situations may fear they will jeopardise their reputation and career if they speak up
 - Take the time to fully understand each journal's guidelines for authorship, and industry requirements
 - If you find yourself in a challenging situation that you are not sure how to handle, consult with a trusted mentor or supervisor

Competing Interests

Transparency and objectivity are essential in scientific research and the peer review process.

When an investigator, author, editor, or reviewer has a financial/personal interest or belief that could affect his/her objectivity, or inappropriately influence his/her actions, a potential competing interest exists.

Such relationships are also known as dual commitments, competing interests, or competing loyalties.

The most obvious competing interests are financial relationships such as:

- Direct: employment, stock ownership, grants, patents.
- Indirect: honoraria, consultancies to sponsoring organisations, mutual fund ownership, paid expert testimony .

Undeclared financial interests may seriously undermine the credibility of the journal, the authors, and the science itself.

An example might be an investigator who owns stock in a pharmaceutical company that is commissioning the research.

Competing Interests

Competing interests can also exist as a result of personal relationships, academic competition, and intellectual passion. An example might be a researcher who has:

- A relative who works at the company whose product the researcher is evaluating.
- A self-serving stake in the research results (e.g. potential promotion/ career advancement based on outcomes).
- Personal beliefs that are in direct conflict with the topic he/she is researching.

Some considerations that should be taken into account include:

- whether the person's association with the organisation interferes with their ability to carry out the research or paper without bias; and
- whether the relationship, when later revealed, make a reasonable reader feel deceived or misled.

Plagiarism

One of the most common types of publication misconduct is plagiarism

—when one author deliberately uses another's work without permission, credit, or acknowledgment.

Plagiarism takes different forms, from literal copying to paraphrasing some else's work and can include:

- Data
- Words and Phrases
- Ideas and Concepts

Plagiarism has varying different levels of severity, such as:

- How much of someone's work was taken—a few lines, paragraphs, pages, the full article?
- What was copied—results, methods, or introduction section? .

When it comes to your work, always remember that crediting the work of others (including your advisor's or your own previous work) is a critical part of the process.

You should always place your work in the context of the advancement of the field, and acknowledge the findings of others on which you have built your research.

Action	What is it?	Is it unethical?	What should you do?
Literal Copying	Reproducing a work word for word, in whole or in part, without permission and acknowledgment of the original source.	<p>Yes.</p> <p>Literal copying is only acceptable if you reference the source and put quotation marks around the copied text.</p>	<p>Keep track of sources you used while researching and where you used it in your paper.</p> <p>Make sure you fully acknowledge and properly cite the original source in your paper.</p> <p>Use quotation marks around word-for-word text and reference properly.</p>
Substantial copying	This can include research materials, processes, tables, or equipment	<p>Yes.</p> <p>"Substantial" can be defined as both quantity and quality of what was copied. If your work captures the essence of another's work, it should be cited.</p>	<p>Ask yourself if your work has benefited from the skill and judgment of the original author?</p> <p>The degree to which you answer "yes" will indicate whether substantial copying has taken place. If so, be sure to cite the original source.</p>

Paraphrasing	Reproducing someone else's ideas while not copying word for word, without permission and acknowledgment of the original source.	<p>Yes.</p> <p>Paraphrasing is only acceptable if you properly reference the source and make sure that you do not change the meaning intended by the source.</p>	<p>Make sure that you understand what the original author means.</p> <p>Never copy and paste words that you do not fully understand.</p> <p>Think about how the essential ideas of the source relate to your own work, until you can deliver the information to others without referring to the source. Compare your paraphrasing with the source, to make sure you retain the intended meaning, even if you change the words.</p>
Text-recycling	Reproducing portions of an author's own work in a paper, and resubmitting it for publication as an entirely new paper.	<p>Yes.</p> <p>See our separate factsheet on duplicate submission.</p>	<p>Put anything in quotes that is taken directly from a previously published paper, even if you are reusing something in your own words. Make sure to reference the source accordingly.</p>

Simultaneous Submission

Authors have an obligation to make sure their paper is based on original

—never before published—research.

Intentionally submitting or re-submitting work for duplicate publication is considered a breach of publishing ethics.

- Simultaneous submission occurs when a person submits a paper to different publications at the same time, which can result in more than one journal publishing that particular paper.
- Duplicate/multiple publication occurs when two or more papers, without full cross-reference, share essentially the same hypotheses, data, discussion points, and/or conclusions.
 - This can occur in varying degrees: literal duplication, partial but substantial duplication, or even duplication by paraphrasing.

One of the main reasons duplicate publication of original research is considered unethical,

- is that it can result in "inadvertent double- counting or inappropriate weighting of the results of a single study, which distorts the available evidence".

Simultaneous Submission

Points to remember:

- articles submitted for publication must be original and must not have been submitted to any other publication.

At the time of submission,

- authors must disclose any details of related papers (also when in a different language), similar papers in press, and translations.

While the boundaries around duplicate publication may vary from field to field,

- all publishers have requirements for submitting papers.

It's a good idea to make sure you fully understand them to avoid violating the process.

Action	What is it?	Is it unethical?	What should you do?
Simultaneous submission	Submitting a paper to two or more journals at the same time.	<p>Yes.</p> <p>Submission is not permitted as long as a manuscript is under review with another journal.</p>	<p>Avoid submitting a paper to more than one publication at a time.</p> <p>Even if a submitted paper is currently under review and you do not know the status, wait to hear back from the publisher before approaching another journal, and then only if the first publisher will not be publishing the paper.</p>
Duplicate publication	When an author submits a paper or portions of his or her own paper that has been previously published to another journal, without disclosing prior submission(s)	<p>Yes.</p>	<p>Avoid submitting a previously published paper for consideration in another journal.</p> <p>Avoid submitting papers that describe essentially the same research to more than one journal.</p> <p>Always provide full disclosure about any previous submissions (including meeting presentations and posting of results in registries) that might be regarded as duplicate publication.</p> <p>This should include disclosing previous publication of an abstract during the proceedings of meetings</p>

<p>Duplication by Paraphrasing or "Text-recycling"</p>	<p>When an author writes about his or her own research in two or more articles from different angles or on different aspects of the research without acknowledgment of the original paper.</p>	<p>Yes.</p> <p>Creating several publications from the same research, is considered manipulative.</p>	<p>Put anything in quotes that is taken directly from a previously published paper, even if you are reusing something in your own words. Make sure to reference the source accordingly.</p>
<p>Translations of a paper published in another language</p>	<p>Submitting a paper to journals in different languages without acknowledgment of the original paper.</p>	<p>Yes.</p> <p>Translated articles are acceptable when all necessary consents have been obtained from the previous publisher of the paper in any other language and from any other person who might own rights in the paper.</p>	<p>If you want to submit your paper to journal that is published in a different country or a different language, ask the publisher if this is permissible. At the time of submission, disclose any details of related papers in a different language, and any existing translations.</p>

Research Fraud

Research fraud is publishing data or conclusions that were not generated by experiments or observations, but by invention or data manipulation.

There are two kinds in research and scientific publishing:

- Fabrication. Making up research data and results, and recording or reporting them.
- Falsification. Manipulating research materials, images, data, equipment, or processes.

Falsification includes changing or omitting data or results in such a way that the research is not accurately represented. A person might falsify data to make it fit with the desired end result of a study.

Both fabrication and falsification are serious forms of misconduct because they result in a scientific record that does not accurately reflect observed truth.

Action	What is it?	Is it unethical?	What should you do?
Manipulating data	Intentionally modifying, changing, or omitting data.	Yes	<p>Never tamper with or change data.</p> <p>Keep meticulous records of your data.</p> <p>Records of raw data should be accessible in case an editor asks for them-even after your paper has been published.</p> <p>Understand the publisher's policies on data before you submit a paper.</p>
Manipulating Data Images	This can include research materials, processes, tables, or equipment.	<p>Yes.</p> <p>Your manuscript may be rejected if the original data are not presented or misrepresented.</p>	<p>If you need to adjust an image to enhance clarity, make sure you know what is considered acceptable before submitting your paper.</p> <p>Even if the image manipulations are considered acceptable, report it to the publication prior to submitting your paper.</p> <p>Review any data images used to support your paper against the original image data to make sure nothing has been altered.</p>

Salami Slicing



Image taken from wikipedia commons

- The “slicing” of research that would form one meaningful paper into several different papers is called "salami publication" or "salami slicing".
- Unlike duplicate publication, which involves reporting the exact same data in two or more publications, salami slicing involves breaking up or segmenting a large study into two or more publications.
 - These segments are referred to as "slices" of a study.
- As a general rule, as long as the "slices" of a broken up study share the same hypotheses, population, and methods, this is not acceptable practice.
 - The same "slice" should never be published more than once.

Action	What is it?	Is it unethical?	What should you do?
Breaking up or segmenting data from a single study and creating different manuscripts for publication	Publishing small 'slices' of research in several different papers is called 'salami publication' or 'salami slicing'.	<p>Yes.</p> <p>Salami slicing can result in a distortion of the literature by leading unsuspecting readers to believe that data presented in each 'slice' is derived from a different subject sample.</p>	<p>Avoid inappropriately breaking up data from a single study into two or more papers.</p> <p>When submitting a paper, be transparent. Send copies of any manuscripts closely related to the manuscript under consideration.</p> <p>This includes any manuscripts published, recently submitted, or already accepted.</p>

Part 2: Paraphrasing, summarising and quoting

Paraphrasing, Quoting, and Plagiarism

Paraphrasing

- Paraphrasing means expressing information or ideas from other sources in your own words in a similar number of words as the source text.
- Paraphrasing is NOT simply replacing words with synonyms or rearranging the structure of sentences.
- It involves rephrasing a text substantially while retaining the original meaning.
- Paraphrasing involves acknowledging the original source with proper referencing

A paraphrase is particularly useful:

- when you are dealing with facts and definitions
- when you need to refer to a chunk of information from one particular part of a source (e.g. a paragraph in the introduction of a journal article).

Why Should You Paraphrase?

“Paraphrasing” is expressing the meaning of someone else’s words in your own words instead of quoting directly.

By paraphrasing effectively, you can:

save space and keep your study more focused

distill complex information into language that general readers can understand

avoid plagiarism and provide your own authorial voice in your paper

How to paraphrase?

The first step in paraphrasing is to read the original text and get a full grasp of it.

You may need to read the original text a few times and check the meaning of key words to fully understand it.

While you are reading, think about the overall meaning of each paragraph or section
just don't just focus on the individual words and sentences.

After each paragraph or section, put the reading aside and state it in your own words.

When you can do this, you are ready to write your paraphrase.

Finally, proofread, revise and edit your paraphrase as necessary.

Please include a proper citation when paraphrasing and be careful not to change the author's meaning.

Incorrect Paraphrasing

Incorrect paraphrasing is another way plagiarism can be present in an author's writing.

Incorrect paraphrasing is usually when an author replaces just a word or two of a source's phrasing with synonyms.

This type of paraphrasing does not show enough understanding and engagement with the text.

Instead, the author needs to strive to take ideas and information and place them in his or her own words.

Two common characteristics of incorrect paraphrasing includes when the paraphrased version:

- Has the same sentence structure as the original and

- Has key words from the original that the author simply rearranged or replaced.

Changing Source Text into a Paraphrase

Step 1: Read important parts of the source material until you fully understand its meaning.

Step 2: Take some notes and list key terms of source material.

Step 3: Write your own paragraph without looking at the source material, only using the key terms.

Step 4: Check to make sure your version captures important parts and intent of the source material.

Step 5: Indicate where your paraphrasing starts and ends using in-text citation.

Paraphrasing Checklist

Write the paraphrased statement in your own words.

Always include a citation with a paraphrase—you are still using someone else's ideas

When you use a direct quote, be sure to clarify the quote to show why you have included it.

Avoid using blocks of quoted text, especially in papers on the natural sciences.

You can almost always use a paraphrase/quote combination instead.

Overall, focus on *your* study first—any extra information should be used to enhance your arguments or clarify your research.

Here is the original source an author might use in a paper:

Differentiation as an instructional approach promotes a balance between a student's style and a student's ability. Differentiated instruction provides the student with options for processing and internalizing the content, and for constructing new learning in order to progress academically.

Thompson, 2009

Differentiation as an instructional approach promotes a balance between a student's style and a student's ability. Differentiated instruction provides the student with options for processing and internalizing the content, and for constructing new learning in order to progress academically.

Differentiation is a way to encourage equality between the approach and talent of the student (Thompson, 2009). This type of instruction gives students different ways to deal with and grasp information, and for establishing new learning to move on in education (Thompson, 2009).

- How is the paraphrasing done?
- An example of bad paraphrasing of the source.
- Even though the author is citing correctly, underlined words are simply synonyms of words used in the original source.
- You can also see how the sentence structure is the same for both the original source and this paraphrase.

Differentiation as an instructional approach promotes a balance between a student's style and a student's ability. Differentiated instruction provides the student with options for processing and internalizing the content, and for constructing new learning in order to progress academically.

Differentiation is a way to encourage equality between the approach and talent of the student (Thompson, 2009). This type of instruction gives students different ways to deal with and grasp information, and for establishing new learning to move on in education (Thompson, 2009).

Teachers use differentiated instruction to help students learn, allowing the teacher to cater lessons to the way each student learns and each student's skill (Thompson, 2009).

So, why is this an example to note a better way to paraphrase the source:

- In this example,
 - the author has taken the essential ideas and information from the original source,
 - but has worded it in her/his own way, using unique word choice and sentence structure.
-
- The author has condensed Thompson's (2009) information,
 - including what is relevant to her/his paper,
 - but leaving out extra details that she does not needed.

You should paraphrase...	You should use direct quotes...
<ul style="list-style-type: none"> • to show you understand the main ideas/arguments of the author • to help explain difficult concepts or terminology • to highlight original <i>ideas</i> that are interesting when the original <i>language</i> is not as interesting • to change the <i>emphasis</i> of information to match your own arguments • to provide a clear “voice” in your paper that isn’t directly connected to other works 	<ul style="list-style-type: none"> • when the original wording is strong and engaging • if the quote is very well-known or difficult to paraphrase well • where the exact words of an authority would lend support to your own ideas • when you want to present the author’s detailed methods or findings or exact stated position

Quoting means repeating the author's exact words.

In some disciplines, such as literary studies and history, quoting is used frequently to support an argument. In most others, especially science and technology, it is used sparingly, if at all.

Make sure you understand how quoting is used (with respect to the referencing style).

Keep the quote as brief as possible, and integrate it into the development of your argument or discussion.

This means commenting on the quote to show how it connects to your point.

All quotes require page numbers in the citation.

Some situations which might justify direct quoting could be:

- the author has devised and named a new theory, model, concept, technique or scale
- the author has provided a definition of a concept
- the author's words have unusual impact and would be difficult to express in any other way
- the author is a notable authority on the subject and their words will lend weight to your argument
- you are expected to use examples to justify your interpretation or analysis of a literary work

There are two broad types of citation; information-prominent and author-prominent.

Information-prominent citation is used when **what** (i.e. the information) you want to convey is more important to your purpose than telling the reader **who** (i.e. the author) wrote that information. In this case the citation follows the content.

For example:

In this case the citation follows the content.

For example:

By focusing on the observable manifestations of mental processes, natural science is at risk of being defined too narrowly as the “science of meter reading”, thereby diminishing the importance of the underlying cognitive processes that behaviour is based on (Chomsky, 2006, p. 57).

Author-prominent citation is used when the primary importance is given to **who** (i.e. the author) has written the information, findings or opinion you are presenting in your writing rather than **what** is presented. In this case the author is usually mentioned in the subject of the sentence. Instances when author-prominent citation are useful include:

- when the author is a noted authority on the topic
- when tracing the historical or chronological development of new thinking or discoveries
- when comparing differing expert opinions.

For example:

The eminent linguist, Noam Chomsky has warned that a narrow definition of the natural sciences as the ‘science of meter reading’, fails to acknowledge the complex cognitive processes that observable behaviour is based on (2006, p. 57).

General Formatting Rules for Quoting and Paraphrasing

Direct Quote: simply a “copy-and-paste” of the original words and/or word order.

In all research papers with formatting guidelines (APA, AMA, MLA, Harvard etc.), quoted text must be accompanied by quotation marks and in-text citation.

Paraphrasing: Can include some key terms from the original work, but must use new language to represent the original work—DO NOT COPY THE ORIGINAL WORK.

When you paraphrase, you do not need to include quotations marks, but you must still cite the original work.

Summarising

Summarising means briefly outlining the main points of a reading in your own words without adding your own ideas or changing the author's meaning.

Summarised information must be accompanied by a citation.

A summary is particularly useful if you need to refer to the main idea/argument presented in a source (e.g. a book/chapter/article, etc.).

How to summarise?

Similar to paraphrasing, the first step in summarising is to read the original text and get a full grasp of it.

You may need to re-read the original source a few times and look up the meaning of key words to fully understand it.

When reading, ask yourself: What is the overall message? What are the key points?

Concentrate on the essentials and leave out details and examples.

Put the source aside and state its key points in your own words.

When you can do this, you are ready to write your summary.

Finally, proofread, revise and edit your summary as necessary.

Don't forget to include a proper citation when summarising and be careful not to add new points or change the original meaning.

Select References

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Technical Communication

Session 7

Scientific Literature Review

01.10.2025

Overview

1. What is a Scientific Literature Review?
2. How to write a Scientific Literature Review
3. Key elements of a Coherent Literature Review
4. Literature Review Structure

What is a Scientific Literature Review?

Scientific Literature Review

A scientific literature review is *a critical account of what has* been published on a topic by accredited researchers.

It may be for:

- A stand-alone assignment
- An introduction to an essay, report, thesis, etc.
- Part of research/grant proposals

Scientific Literature Review

Note : the literature, the research, the scholarship

What is the field?

“[D]ifferent disciplines ... have field-specific expectations for what a literature review is and does” (Purdue OWL)

Goals of this lecture

Understand the principles

Apply the process

Gain confidence and motivation



Scientific Literature Review

Writing a literature review will:

- Improve your topic knowledge
- Provide new insight on your topic to others
- Demonstrate your literature searching abilities
- Demonstrate your critical analysis skills
- Demonstrate your communication/writing skills

Scientific Literature Review

A scientific literature review is **not:**

- An English essay... using *scientific writing*!
- A summary of each research article that you read
- Based on personal opinion or biased towards your opinion
- A chronological history of events in your research area

Scientific Literature Review:
**What is the purpose of a literature
review?**

Scientific Literature Review

What is the purpose of a literature review?

Communication and advancement of scientific knowledge!

- Scientific knowledge is **not static**: reviews help scientists to understand how knowledge in a particular field is **changing and developing** over time
- There is a **significant output** of scientific publications – literature reviews save time for the scientific community
- Literature reviews can lead to **new scientific insights** and highlight gaps, conflicting results and under-examined areas of research

Scientific Literature Review

A scientific literature review should:

- Provide a **clear statement** of the topical area (scope)
- Provide a **range of research** on the topic – and not just the “good” data!
- **Critically analyse** a selected topic using a published body of knowledge (backed-up arguments)
- Provide an indication of what **further research** is necessary
- Identify areas of **controversy** in the literature

Scientific Literature Review

Plan for a lit review

What is the working area?

What is its context?

How has it developed?

What is the research question for the lit review?

How ...? Why ... ? not just What ...?

Why does the research in this area matter?

How To Write A Scientific Literature Review?

Scientific Writing!

...is writing about scientific topics aimed at specialists in a particular field

Assume the reader is familiar with the research/topic area but not with the *specifics* of your review...

i.e. your Professor, your Principal Investigator, or any external reviewer

peer-reviewers (journal articles, research papers, book chapters, grant proposals)

Use precision, clarity and objectivity!

Scientific Writing!

1. Be precise!

Ambiguities in writing cause confusion and may prevent a reader from grasping key concepts of your review...

- Use precise concrete language, no ambiguity
- Exclude similes/metaphors (and humour!)
- Be *quantitative* wherever relevant (stats, numbers etc.)

Scientific Writing!

2. Be clear!

Concepts in the sciences can often be complex; without clarity the reader may be confused or misled

- Simple language – no unnecessary “frills” (distractions)
- Pay attention to sentence structure, grammar
Your reader will be interested based on the science only... make it easy for them to access!

Scientific Writing!

3. Be objective!

Any claims that you make need to be based on facts, *not intuition or emotion*

- **Passive voice** – focus is on the literature!
- Avoid **assumptions** or sweeping statements
- Be aware of **research limitations** and refer to these in the review

How to Write a Scientific Literature Review?

Reviewing the literature requires four stages:

1. Problem formulation - Which topic is being examined and why? What aspects will be included/excluded? Define your scope

2. Literature search - Identifying relevant research

3. Critical analysis – Criticise the experts; identify conflicting evidence, assumptions, errors and misconceptions

4. Evaluation – which authors are most convincing and provide the most significant scientific contribution? Have I conducted a fair and objective literature review?

1. Problem Formation

Ask yourself questions like these:

- What useful reviews are **missing** or not up to date in my research area?
- What new review topic would be useful to scientists?
- Is there a **specific aspect of this topic** that my literature review might help to define?
eg. critically comparing different methodological approaches, contrasting evidence, assessing therapeutic potential, etc.
- What is the **scope** of my literature review? *Be specific*

Literature Searching...

1. OnlineResearch(basic)–BackgroundInformation

- Relevant “background” websites (eg. university websites, journal websites, jstor)

2. General Literature Search – Literature Overview

- Google Scholar/Books

find other relevant literature reviews in the area to see what has been done/what is needed,
use appropriate key words

3. Specific Literature Search – The Detail

- Library databases e.g *Web of Science*
- “Advanced search” tool in Google Scholar
- Identify key references for each topic of your review

Note: Please use the Library!

**The Library staff are always
there to help if you have
questions on literature
searching.**

3. Critical Analysis

In assessing each source, consideration should be given to:

- **Provenance** - Author's credentials? Are the author's arguments supported by evidence?
- **Objectivity** - Is the author's perspective fair? Is contrary data considered? Is information ignored to prove the author's point? (bias)
- **Persuasiveness** – Is the author's data convincing?
- **Value** - Does the work contribute in a significant way to an understanding of the field?

*...this involves **CRITICAL THINKING!***

What is critical thinking?

“The process of looking at ideas and information critically, taking nothing for granted, but questioning accuracy, motivation and inferences, and seeking new understanding, connections and insights.” Cottrell (2016)

i.e. weighing up the evidence and arguments for or against something, and coming up with your own informed opinion.

Ask questions!

- “Is that really true?”
- How do you know?
- Show me the evidence.
- Is that evidence reliable?”

“There is
evidence
on both
sides”



Critical Thinking...

Move from **Description** to **Analysis!**

Description – reproducing information

- Summarising texts - accepting details, results etc.

Analysis – deconstructing information in order to:

- *Challenge* assumptions; perspectives
- Show *limitations* in studies, exceptions to cases
- Highlight *under-examined* aspects of research

Key aspects of critical thinking

- Identify evidence to **back-up and challenge** key points
- Detecting **inconsistencies and mistakes** in authors' reasoning
- Detecting **bias**, premature conclusions, lacking evidence
- Distinguishing between **fact and opinion**
- Evaluating **conflicting** opinions/research
- Suggesting new or different **solutions**
- Constructing **your own arguments and opinions**

What should I be asking?

- Why is the author choosing to use the evidence presented?
- Is there a hidden agenda? (*eg. financial gain*)
- Are the sources reliable and objective?
- Is there bias present?
- Have all of the points been cited?
- Is there information missing?
- Are there conflicting opinions/conclusions?
And most importantly....

Critical Thinking...

Critical Thinking is the key to a good analysis...

...don't be afraid to question, critique (the experts) if you have understood the concept and have located the gaps

Understanding of the topic is very important - this is the most important aspect of a good literature review

4. Evaluation and Interpretation

- What **conclusions** can I make from the most convincing literature? What are my opinions/arguments?
Also evaluate your own interpretations...
- Have I made a well-informed decision? How good was my **information seeking**? Has my search been wide enough to ensure all relevant material is included? Has it been narrow enough to exclude irrelevant material?
- Have I **critically analysed** the literature I use?
- Instead of just listing and summarising research, do I assess them, discussing strengths and weaknesses?
- Have I cited and discussed studies **contrary** to my perspective to form a well-balanced argument?

Coherent Scientific Literature Reviews

Coherent Scientific Literature Reviews

Aim for:

- **Clear and cohesive** essay that integrates the key details of the literature and **communicates your point of view**
- Tackle **one key point** at a time
- Use **subheadings**, especially in long reviews
- Check the **flow** of your argument for coherence (logical order?)
*...this is all about **STRUCTURE!***

Coherent Scientific Literature Reviews

What is the principle of organisation? Choose one:

chronology — development of the topic over time (best if unfamiliar) — patterns, turning points, key debates — note how and why trends took hold

concept — where the area falls into clearly demarcated areas, each with its own development, use subsections

method — where the area crosses different disciplines or fields (qualitative/quantitative,1 empirical/theoretical2)

theory — comparing models and definitions of key concepts — tendency to argumentation or synthesis

Ways to think

Hot debates, cool topics [dead zones]

Stacks, trends, sparks, clashes, and gaps

Don't neglect the loners ... some interesting niche area

Scientific Literature Review

How to structure a scientific literature review?

- **Introduction:** An *overview* of the topic under consideration, along with the *objectives* of the literature review.
- **Main body:** Critical analysis, evaluation of topically relevant research/data; Break into **sub-headings**
- **Conclusion:** Summarise the **key points** from your review

Before you start writing...

1. Brainstorm/plan your review

What are the key aspects of your review?

2. Decide on the number of “topics” you will address

Of the most interesting/relevant topics... how many can you address in the allowed word count? Prioritise!

3. Choose your topics

Scan the literature, make sure there is enough information out there for you to complete a coherent, critical summary of each chosen topic

1. Introduction

It is usually easier to write this after the main body...

Introduce your topic by highlighting the **core scientific facts** that are well backed up and widely accepted

Highlight the **importance** of the review – What are you assessing? Research relevance? Gap in research area? New perspective?

What is the **core aim** of this review? To compare and contrast conflicting evidence? To identify under-examined aspects of the topic?

Tell the reader *what you are going to talk about... list your topics in order!*

2. Writing the Main Body

- Group research topics according to common elements and back up main points with research
- Focus on **recent** data where possible – scientific fact changes/develops over time!
- Summarise individual studies or articles with as much or as little detail as is relevant – detail denotes significance!
- Tackle **one key point per paragraph** so as not to overwhelm the reader
- Use **sub-headings** to group your topics
- Use diagrams, figures, tables where appropriate

Table 1: Proposed tabular structure to plan your literature review

Tackle 2-3 key points per section...			
Intro	Go from the broad to the specific. Introduce the general topic, why it is an important area, then state what you will specifically do to investigate it further.		
Section 1	Sub-point 1	Sub-point 2	Sub-point 3
Section 2	Sub-point 1	Sub-point 2	Sub-point 3
Section 3	Sub-point 1	Sub-point 2	Sub-point 3
Conclusion	Go from the specific to the broad. State the conclusions you can draw from the points you've made in the essay, and connect this learning to the general topic. End by posing a question for future research in the field.		

...one key point per paragraph!

1. Topic Sentence

- Start each topic with a strong “umbrella” sentence introducing your key point

2. Supporting Sentences

- Provide context, examples or data
- Each point backed up with a source/reference
- Use “linker” words to introduce similar points
- Opposing data should also be considered

3. Concluding Sentence

- Include summary sentences at end of paragraphs... why this information is relevant
- May link to following paragraph

2. Main Body: Figures/Tables

- Aim for one key figure/table per section; this can be to:
 - *illustrate a complex concept*
 - *summarise a large body of relevant data*
 - *describe the order of a process (flow diagrams)*
- Legend *below* image/figure and *above* table
- Always refer to figures/tables in text... direct the reader to them
(*as seen in Figure 1; as summarised in Table 1*)
- Provide a detailed legend... each figure + legend should stand in its own right without the review text
- **Figures and tables provide a break for the reader and a chance to understand and reflect on key concepts**

Writing the Conclusion

- Maintain the focus established in the introduction
- Summarise major research contributions to the scientific field (most convincing data) and make your point of view clear
- Point out major flaws/gaps/inconsistencies in research
- Highlight potential future studies
- Provide closure so that the path of the argument ends with a conclusion of some kind

NOTE: A literature review in a thesis or dissertation usually leads to the research questions that will be addressed.

Revising & Editing

Voice – passive voice? Target audience?

Cohesion – sentence length/clarity?

Criticality – clear critical thinking?

Referencing – have I referenced where appropriate?

Grammar – Grammarly!

Mechanical issues – sentence length, spelling, punctuation

Ask peers/family members – get second/third/fourth opinion!

Read out loud Give yourself a break – Fresh eyes!

YOU HAVE PUT IN SO MUCH TIME ALREADY.... So make it perfect

Referencing

It is essential to credit published papers for work mentioned in your manuscript...

- In-text
- Reference List/Bibliography – *what is the difference?*

“atherosclerosis has been claimed to be an independent risk factor for cardiovascular death (Detrano *et al.*, 2008)”.

Detrano R, Guerci AD, Carr JJ, Bild DE, Burke G, Folsom AR, Liu K, Shea S, Szklo M, Bluemke DA, O'Leary DH, Tracy R, Watson K, Wong ND, Kronmal RA. Coronary calcium as a predictor of coronary events in four racial or ethnic groups. *N Engl J Med* 2008. **358**:pp1336-1345.

Harvard referencing guide....

CiteThemRight....

Zotero referencing manager... Mendeley/RefWorks – other options

Referencing

Figures/Tables:

In-text citation in the figure legend after description

May need to ask for permission from the publisher – be careful! (*is the image copyrighted?*)

If figure is adjusted: “image adapted from [source]”

MAKE SURE YOU REFERENCE THE SOURCE MATERIAL (original research paper, where appropriate) and NOT A REVIEW OF THE RESEARCH

Except when you are referencing another reviewer’s opinion/critique etc.

- Avoid plagiarism... use quotation marks for direct quotes + “in-text” citation
- Use “in-text” citation only to reference ideas/opinions/indirect quotes

Technical Communication

Session 8

Scientific Paper and the IMRAD format

8.10.2025

Types of Scientific Papers - a few categories

- Original article – information based on original research
- Case reports – usually of a single case
- Technical notes - describe a specific technique or procedure
- Technical report - Technical report is a formal report designed to convey technical information in a clear and easily accessible format. It is divided into sections which allow different readers to access different levels of information.
- Review – detailed analysis of significant research done on a specific topic
- Commentary – short article with author's personal opinions, backed by argumentation based on evidences.
- Editorial – often short review or critique of original articles

Organisation of a Research Paper

- Title
- Abstract
- Introduction
- Methods
- Results
- Analysis/Discussion
- Conclusions
- Acknowledgements
- References

Note: most scientific journals follow the format of the Structured Abstract. Occasionally, the Results and Discussion are combined – when the data need extensive discussion to allow the reader to follow the train of logic of the research.

The basic IMRAD format

- Here is the basic format scientists have designed for research articles:
- IMRAD
 - Introduction
 - Methods and Materials
 - Results
 - Analysis
 - Discussion

The **IMRAD** Format

- **I**ntroduction: What was the question?
- **M**ethods: How did the research(s) try to answer it?
- **R**esults: What did the researchers find?
- **A**nalysis: What does that imply/indicate?
- **D**iscussion: What do the results mean?

The IMRAD Format

- **Title** – describes paper's content clearly using keywords (for databases and search engines)
- **Abstract** - a summary (~ 150-200 words) of the problem, the method, the results and the conclusions; the reader can decide whether or not to read the whole article.
- **Introduction** - clearly states the problem being investigated & reasons for the research; summarises relevant research to provide context; identifies the questions being answered; briefly describes the experiment, hypothesis(es), research question(s) & general experimental design or method

The IMRAD Format

- **Methods** - provides the reader enough details so they can understand and replicate the research; explains how the problem was studied; identifies the procedures followed; explains new methodology in detail; includes the frequency of observations, what types of data were recorded, etc.
- **Results** - presents the findings, and explains what was found; shows how the new results are contributing to the body of scientific knowledge; follows a logical sequence based on the tables and figures presenting the findings to answer the question or hypothesis(es)

The IMRAD Format

- **Analysis, Discussion, and Conclusions** - describes what the results mean regarding what was already known about the subject; indicates how the results relate to expectations and to the literature previously cited; explains how the research has moved the body of scientific knowledge forward; outlines the next steps for further study
- **Acknowledgements** – recognise various contributions of other workers
- **References** - the sources of previously published work; includes information not from the experiment and not ‘common knowledge’

Purpose of technical writing

The people reading such reports have two primary goals:

They want to gather the information presented

They want to know that the findings are legitimate

IMRAD

When you are writing after conducting an experiment/study

Introduction	States your hypothesis	explains how you derived that hypothesis and how it connects to previous research; gives the purpose of the experiment/study
Methods	details how you tested your hypothesis	clarifies why you performed your study in that particular way
Results	provides raw (i.e., uninterpreted) data collected	(perhaps) expresses the data in table form, as an easy-to-read figure, or as percentages/ratios
Analysis	inspecting, cleansing, transforming and comprehending with the goal of discovering useful information, informing conclusions and supporting decision-making	Helps you think over the entire outcome before you to conclusions
Discussion	considers whether the data you obtained support the hypothesis	explores the implications of your finding and judges the potential limitations of your experimental design

How to write scientific review paper

Introduction	Locate your problem statement	Identify the purpose and objective of the study
Method	What methods have been applied?	Document the methodology
Result	What have been the outcome?	What do you infer?
Analysis	State your observation	Closely monitor the result and engage critically
Discussion	What is your opinion?	How has this study contributed to the understanding of the issue?

Our Focus

- Part 1: Technical reports
- Part 2: Review articles

Guide to technical report writing

1. Introduction

A technical report is a formal report designed to convey technical information in a clear and easily accessible format.

It is divided into sections which allow different readers to access different levels of information.

We will try to understand:

- the commonly accepted format for a technical report;

- the purposes of the individual sections;

- how to go about drafting

- refining a report in order to produce an accurate, professional document.

Guide to technical report writing

2. Structure

A technical report should contain the following sections;

Section and its Details

Title page

Must include the title of the report. Reports for assessment, where the word length has been specified, will often also require the summary word count and the main text word count

Summary

A summary of the whole report including important features, results and conclusions

Contents

Numbers and lists all section and subsection headings with page numbers

Introduction

States the objectives of the report and comments on the way the topic of the report is to be treated. Leads straight into the report itself. Must not be a copy of the introduction in a lab handout.

Guide to technical report writing

The sections which make up the body of the report

Divided into numbered and headed sections. These sections separate the different main ideas in a logical order

Conclusions

A short, logical summing up of the theme(s) developed in the main text

References

Details of published sources of material referred to or quoted in the text (including any lecture notes and URL addresses of any websites used).

Bibliography

Other published sources of material, including websites, not referred to in the text but useful for background or further reading.

Acknowledgements

List of people who helped you research or prepare the report, including your proofreaders

Appendices (if appropriate)

Any further material which is essential for full understanding of your report (e.g. large scale diagrams, computer code, raw data, specifications) but not required by a casual reader

Guide to technical report writing

3. Presentation

For technical reports required as part of an assessment, the following presentation guidelines are recommended;

Script

The report must be printed single sided on white A4 paper. Hand written or dot-matrix printed reports are not acceptable.

Page numbers

Do not number the title, summary or contents pages. Number all other pages consecutively starting at 1

Font, Size, Spacing

Guide to technical report writing

4. Planning the report

a checklist of the main stages;

Collect your information. Sources include laboratory handouts and lecture notes, the University Library, the reference books and journals in the Department office.

Keep an accurate record of all the published references which you intend to use in your report, by noting down the following information;

- **Journal article:**
- author(s)
- title of article
- name of journal (*italic* or underlined)
- year of publication
- volume number (**bold**)
- issue number, if provided (in brackets)
- page numbers

Guide to technical report writing

- **Book:**
- author(s)
- title of book (italic or underlined)
- edition, if appropriate
- publisher
- year of publication

Write down topics and ideas from your researched material in random order. Next arrange them into logical groups.

Keep note of topics that do not fit into groups in case they come in useful later.

Put the groups into a logical sequence which covers the topic of your report.

Structuring the report.

Using your logical sequence of grouped ideas, write out a rough outline of the report with headings and subheadings.

Guide to technical report writing

5. Writing the first draft

Who is going to read the report?

For coursework assignments, the readers might be fellow students and/or faculty markers.

In professional contexts, the readers might be managers, clients, project team members.

The answer will affect the content and technical level, and is a major consideration in the level of detail required in the introduction.

- Begin writing with the main text, not the introduction.
- Follow your outline in terms of headings and subheadings.
- Let the ideas flow; do not worry at this stage about style, spelling or word processing.
- If you get stuck, go back to your outline plan and make more detailed preparatory notes to get the writing flowing again.
- Make rough sketches of diagrams or graphs.
- Keep a numbered list of references as they are included in your writing and put any quoted material inside quotation marks
- Write the Conclusion next, followed by the Introduction.
- Do not write the Summary at this stage.

Guide to technical report writing

6. Revising the first draft

This is the stage at which your report will start to take shape as a professional, technical document.

In revising what you have drafted you must bear in mind the following, important principle;

- The essence of a successful technical report lies in how accurately and concisely it conveys the intended information to the intended readership.
- Keep in mind the guidelines how to write formal English for technical communication. This includes examples of the most common pitfalls in the use of English and how to avoid them.
- Use what you learn and the recommended books to guide you.

Most importantly, when you read through what you have written, you must ask yourself these questions;

- Does that sentence/paragraph/section say what I want and mean it to say?
- If not, write it in a different way.
- Are there any words/sentences/paragraphs which could be removed without affecting the information which I am trying to convey?
- If so, remove them.

Guide to technical report writing

7. Diagrams, graphs, tables and mathematics

It is often the case that technical information is most concisely and clearly conveyed by means other than words. Imagine how you would describe an electrical circuit layout using words rather than a circuit diagram.

Here are some simple guidelines;

Diagrams

Keep them simple. Draw them specifically for the report. Put small diagrams after the text reference and as close as possible to it. Think about where to place large diagrams.

Graphs and Tables

Is a graph/table the best way to present your information?

Dependent tables (small) can be placed within the text, even as part of a sentence.

Independent tables (larger) are separated from the text with table numbers and captions.

Position them as close as possible to the text reference. Complicated tables/graphs should go in an appendix.

Guide to technical report writing

8. The report layout

The appearance of a report is no less important than its content.

An attractive, clearly organised report stands a better chance of being read.

Use a standard, 12pt, font, such as Times New Roman, for the main text.

Use different font sizes, bold, italic and underline where appropriate (and as mentioned) but not to excess.

Too many changes of type style can look very fussy.

9. Headings

Use heading and sub-headings to break up the text and to guide the reader.

They should be based on the logical sequence which you identified at the planning stage but with enough sub-headings to break up the material into manageable chunks.

The use of numbering and type size and style can clarify the structure.

Guide to technical report writing

10. References to diagrams, graphs, tables and equations

In the main text you must always refer to any diagram, graph or table which you use.

Label diagrams/graphs/tables always

11. Originality and plagiarism

Whenever you make use of other people's facts or ideas, you must indicate this in the text with a number which refers to an item in the list of references.

Any phrases, sentences or paragraphs which are copied unaltered must be enclosed in quotation marks and referenced by a number.

Material which is not reproduced unaltered should not be in quotation marks but must still be referenced.

It is not sufficient to list the sources of information at the end of the report;

you must indicate the sources of information individually within the report using the reference numbering system.

Guide to technical report writing

Information that is not referenced is assumed to be either common knowledge or your own work or ideas;

if it is not, then it is assumed to be plagiarised i.e. you have knowingly copied someone else's words, facts or ideas without reference, passing them off as your own.

This is a **serious academic offence**.

If the person copied from is a fellow student, then this offence is known as collusion and is equally serious.

Examination boards can, and do, impose penalties for these offences ranging from loss of marks to disqualification from the award of a degree

This warning applies equally to information obtained from the Internet. It is very easy for markers to identify words and images that have been copied directly from web sites.

If you do this without acknowledging the source of your information and putting the words in quotation marks then your report will be sent to the Investigating Officer and you may be called before a disciplinary panel.

Guide to technical report writing

12. Finalising the report and proofreading

Your report should now be nearly complete with an introduction, main text in sections, conclusions, properly formatted references and bibliography and any appendices. Now you must add the page numbers, contents and title pages and write the summary.

13. The Summary

The summary, with the title, should indicate the scope of the report and give the main results and conclusions. It must be intelligible without the rest of the report. Many people may read, and refer to, a report summary but only a few may read the full report, as often happens in a professional organisation.

- Purpose - a short version of the report and a guide to the report.
- Length - short, typically word limit is mentioned
- Content - provide information, not just a description of the report.

Guide to technical report writing

14. Proofreading

This refers to the checking of every aspect of a piece of written work from the content to the layout and is an absolutely necessary part of the writing process.

You should acquire the habit of never sending or submitting any piece of written work, from email to course work, without at least one and preferably several processes of proofreading.

In addition, it is not possible for you, as the author of a long piece of writing, to proofread accurately yourself; you are too familiar with what you have written and will not spot all the mistakes.

When you have finished your report, you must check it very carefully yourself.

You should then give it to someone else, e.g. one of your fellow students, to read carefully and check for any errors in content, style, structure and layout.

You should/could record the name of this person in your acknowledgements.

Research Pitch and Abstract

Technical Communication

Session 9

15.10.2025

Research Pitch

Steps towards a Research Pitch

- Why do we need to develop a research pitch?
- For many individuals, initiating a new piece of research can be very challenging.
- Indeed, young researchers are often daunted by the prospect
 - they literally do not know where or how to start research in a meaningful way

Research Pitch

- The main purpose of any research proposal is to demonstrate to the reader that:
- The problem to be investigated is of significance
- The planned method is appropriate
- The results will likely make a novel contribution to existing literature

3-2-1 method

- Following this, the '3-2-1' countdown represents the core of the research pitch:
- THREE (3) “building blocks “– idea, data tools;
- TWO (2) questions – ‘What’s new?’ And ‘So what?’;
- ONE (1) bottom line for the proposed study – its contribution.

Benefits

- The major benefits of a research pitch are
 - that it allows academics, professors and program co-ordinators to ‘ease in’ their students to the complexities of developing, writing and interpreting scholarly research
 - Help “start a conversation”;
 - Help reduce the “I’m lost” feeling of researchers at early stages;
 - Help reduce the common mistake of “over investing” too quickly in an (bad) idea.
 - Help research mentors take “control” early, while allowing flexibility dealing with diverse student abilities/enthusiasm/independence.

Template

Pitcher's Name	Your name here	FoR category	Field of Research	Date Completed	Insert date here
(A) Working Title	Succinct/informative title here				
(B) Basic Research Question	In one sentence, define the key features of the research question.				
(C) Key paper(s)	Identify the key paper(s) which most critically underpin the topic (just standard reference details). Ideally one paper, but at most 3 papers. Ideally, by “best” in the field, either recently published in Tier 1 journal(s) or recent working paper e.g. on SSRN.				
(D) Motivation	Capture the core academic motivation – which may include identifying a “motivation” that you consider important				

THREE	Three core aspects of any empirical research project i.e. the “IDioTs” guide
(E) Idea?	Identify the “core” idea that drives the intellectual content of this research topic. If possible, articulate the central hypothesis(es).
(F) Data?	1 What data do you propose to use? Why? Unit of analysis? 2 Data Sources? 3 Will there be any problem with missing data/observations? Database merge issues? Data manipulation/”cleansing” issues? 4 Other data obstacles?
(G) Tools?	Basic research design? Knowledge of implementation of appropriate methods? Compatibility of data with planned research framework?

TWO	Two key questions
(H) What's New?	Is the novelty in the idea/data/tools? How are you shaping your arguments based on the evidences collected/found?
(I) So What?	Why is it important to know the answer? How impactful will be the outcome of this research?

ONE	One bottom line
(J) Contribution?	What is the primary source of the contribution to the relevant research literature?
(K) Other Considerations	<p>Is Collaboration needed/desirable? – idea/data/tools? (either internal or external to your institution)</p> <p>Target Journal(s)? Realistic? Sufficiently ambitious?</p> <p>“Risk” Are there any serious challenge(s) that you face in executing this plan? What are they? Are they related to the Idea? The Data? The Tools? Are there ethical considerations?</p> <p>Is the scope appropriate? Not too narrow, not too broad.</p>

Writing a research pitch

(A) Working Title	
(B) Basic Research Question	
(C) Key Papers	
(D) Motivation	
THREE	Three core aspects of any empirical research, that is, the “IDioTs” guide
(E) Idea	
(F) Data	
(G) Tools	
TWO	Two Key Questions
(H) What’s new?	
(I) So What?	
ONE	
(J) Contribution	One bottom line
(K) Other considerations	

Abstract

What is an abstract?

- An abstract is a written statement describing key facts about your research project.
- Mastering the art of abstract writing is essential for boosting the visibility of your research within a given field and for ensuring its future for your career.

What should be an Abstract?

- An abstract should be:
- Informative (a brief overview of your research)
- Descriptive (including the research aim, objectives of your project, and the analytical methodologies applied)
- Critical (the key outcomes and limitations of your work should be described)
- Written in a formal language, limiting yourself to the word count desired

Why is the abstract important?

- Helps to conduct your research
- Helps to present complex information in a clear and concise manner
- Helps to condense detailed report information into a shorter format for database searches
- Helps to provide a summary of your work for future publications and grant applications

Tips towards a good abstract

- Follow the abstract submission guidelines
- Stick to a standard or required structure
- Do not include references unless the guidelines require them.
- Tailor the abstract to the right audience
- Communicate professionally and use formal language
- Say it in the title
- Tell them why your research is important

Writing the Abstract

- When writing an abstract, we must be sure to convey the right amount of information without going into long-winded explanations.
- The order of your abstract is important, so choose an order that helps the reader link each aspect of your work in a logical order.
- Always remember to ask yourself if the data presented produces any unanswered questions.

Let's try the simple 4-step process!

- 1. Introduction: “What is the subject?”
 - Write 1–2 introductory sentences that explain the topic, purpose, and research question(s).
 - The background is needed, but it should not be more in-depth than the results.
- 2. Materials and methods: “How did you conduct the research and generate results?”
 - Write 1–2 sentences describing your research methods (this may also include the type of data analysis you are using).

Let's try the simple 4-step process!

- 3. Results: “Why is it important? What are your discoveries?” Write 1 or 2 sentences describing the results/findings.
- 4. Discussion and further directions: “What is the take-home message of your project and its impact?” Write 1–2 sentences containing your conclusions and recommendations. Your conclusions are your study's contribution to the field.

Some final tips

- In the end, it is very helpful if someone else reads your abstract.
 - If possible, ask your colleagues to provide their feedback.
- Please keep in mind – an abstract is important not only for the conference selection process; it is also essential for your future publication record.
- A good title and abstract will lead to more people reading the paper itself (Figure 2).

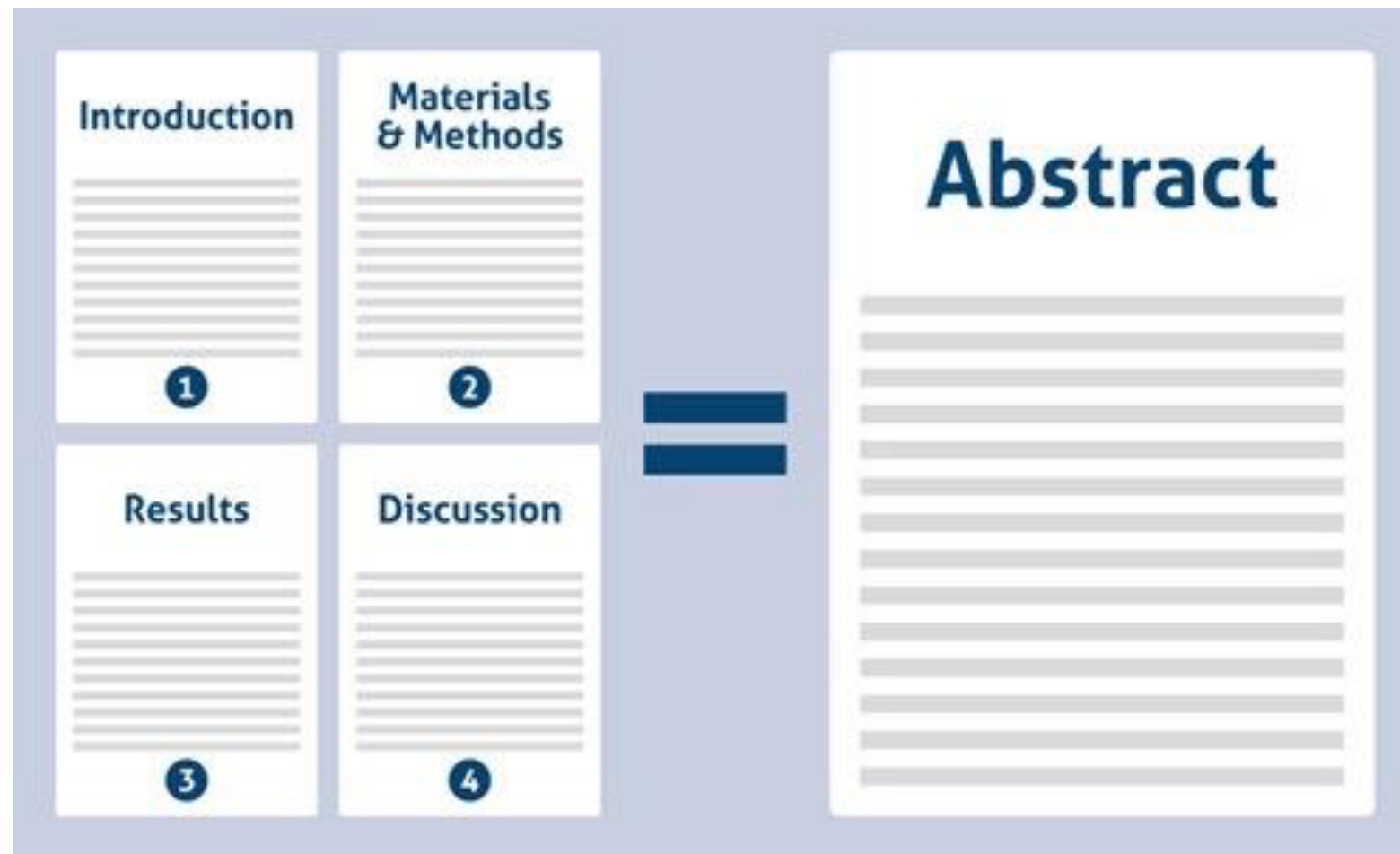


Figure 1. Formatting Your Abstract – Step-by-Step Process.

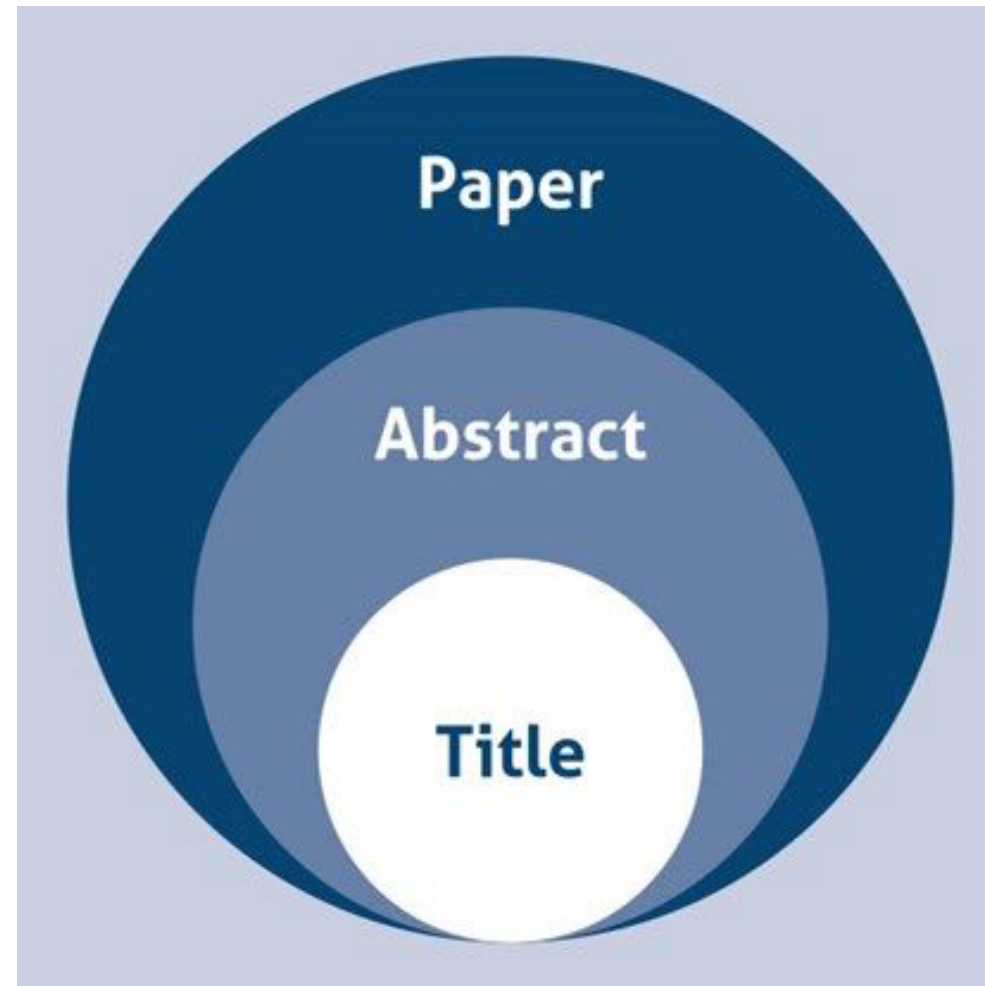


Figure 2. A good abstract will lead to more people being involved in your research