

5. Research Report Writing and Research Publication for Engineers

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5.1. Introduction:

Report writing is formal writing. Many engineers have trouble telling informal writing apart from formal writing. They report to informal writing, since it is easier and more familiar characteristics of informal writing include the use of colloquialisms and jargon, writing in the first person or making 'I' statements, making direct personal statements, and imprecise word choices.

Informal writing is fine for dairy entries, blogs, personal writing letters or emails to friends. However, writing working on assignments and essays for colleges, scientific papers, research papers, conference and seminars presentations and business proposals generally employ a more formal style.

5.2 Report Writing:

5.2.1 The Characteristics of Report Writing Include:

- A formal tone
- Use of the third person perspectives
- Clear focus on the issue
- Precise word choice
- Avoid jargon, slang and abbreviations

5.2.2 Key Features of Any Report Writing Are:

- Thinking precedes writing. Strong report writing begins with solid planning.
- Excellent grammar and constant styling approach.

5.2.3 Characteristics of a High-Quality Report Writing:

- The Theme of the report clearly reflects the focus and the argument.

- A significant and substantial problem has been selected for investigation.
- There is an early statement of the research report aims.
- The report presents a considerable advance on existing knowledge.
- The report demonstrates a systematic pursuit of a consistent line of inquiry
- It is well-planned and executed, with each section clearly building on the last
- There is clear signposting and linking between paragraphs, sections, and chapters. It consistently reminds the reader of the purpose, argument, or overall thrust of the report.
- The literature review is critical and evaluative, and sets forth an argument for why and how the study should be conducted.
- The discussion of the rationale for selecting a methodology and method including up-to-date methodological literature is balanced. The ground-setting is sophisticated and appropriate including exposition of underlying assumptions, and relevance to the research aim.
- The research design is appropriate and allows the questions to be answered.
- There is a meticulous account of the procedure.
- A rich variety of evidence is employed to develop a balanced argument.
- Advanced analytical skills are used to demonstrate a deep understanding of the problem, a clear chain of evidence is laid down.
- The discussion is disciplined and not excessively speculative.
- Conclusions are well drawn and convincing (they relate the outcomes back to the research aims): clear and strong knowledge claims are made about the exact contributions of the thesis.
- Key concepts or variables are clearly defined and consistently used throughout.
- Written expression is elegant, precise, and economical.
- There is evidence of systematic proofreading and error correction.

5.3 Discussion:

5.3.1 Consult:

- Consult with your professor and colleagues about the most appropriate journal where you can publish your research.
- Match your topic to the journal, or vice versa.
- Download the guidelines for authors- these will tell you about the style and structure of your paper.
- Choose frequently cited papers in the journal to see how other authors construct their argumentation, and note down ways in which your research is different and innovative with respect to theirs.
- Choose one paper as a model onto which to map your research, imitating the style and organization. This model should be written by a native English speaker.
- Note down useful/ standard phrases from your model paper which you can then use in your own paper.
- Decide on the best order to write the various sections of your paper. It is generally best to start with a very rough draft of Abstract, and then whichever section is clearest in your head (generally the Materials and Methods).
- Consider having separate documents for each section. This enables you to work on several sections at the same time.

- Make sure your unique contribution to your community is very clear in every section, not just in the Abstract.
- Write in a way that even a non-expert can understand.
- Referees work for free and often outside working hours – never submit a carelessly written manuscript.
- Access referees report forms to understand the ways that referees will evaluate your work.
- Write directly in English and use every opportunity for improving your writing skills.
- Use online resources.

5.3.2 Language:

- Basic English word order is: (1) subject, (2) verb, (3) direct object, (4) indirect object. Keep these four elements in this order and as close to each other as possible.
- If you have a choice of subjects, choose the one that is the most relevant and leads to the shortest construction.
- Avoid delaying the subject. So don't begin a sentence with the impersonal it.
- Avoid inserting parenthetical information between the subject and the verb.
- Most adverbs are located just before the main verb, and before the second auxiliary verb when there are two auxiliaries.
- If possible, delay adverbs until later in the sentence. The main exceptions to this rule are adverbs of contrast and those that enumerate points.
- Put adjectives before the noun they describe or use a relative clause. Do not insert an adjective between two nouns or before the wrong noun.
- Do not indiscriminately put nouns in a string.
- Avoid ambiguous word order.

5.3.3 Reader:

To increase readability:

- Don't separate the subject from its verb using more than 8-10 words.
- Avoid adding extra information to the end of the main clause, if the main clause is already about 15-20 words long.
- Check to make sure that a sentence has a maximum of 30 words, and don't use more than three or four 30- word sentences in the whole paper.
- Consider beginning a new sentence if the original sentence is long and contains one or more of the following (or equivalents): and, which, a link word, the -ing from, in order to.
- Maximize the use of periods (.). Use the minimum number of commas (,), avoid semicolons (;) and parentheses.
- Don't worry about repeating key words. If diving up a long sentence into shorter sentences means that you have to repeat key words, this is not a problem. In fact this repetition will increase the clarity of your writing.
- Always think about your readers- order the information you give them in the most logical way and in the simplest form.
- Begin each paragraph with a topic sentence, then use the rest of the paragraph to develop this topic. If appropriate have a short concluding sentence at the end of the paragraph.

- Decide whether to begin a new section with a short summary, or whether to go directly to the main points.
- Put the topic as the subject of the paragraph or sentence, then give known information (context, background) followed by new information. Consider not giving the known information if it will be obvious for your readers.
- Move from the general to the increasingly specific, do not mix the two.
- Always progress in the most logical and consistent order, do not go backwards and forwards.
- Don't force readers to change their perspective: put negations and qualifying phrases at or near the beginning of a sentence.
- Break up long paragraphs and begin a new paragraph when you talk about your study and your key findings.
- Avoid redundancy in the final paragraph of a section.

5.3.4 Edit:

- You can be more concise by:
- Deleting any words that are not 100% necessary.
- Finding ways of expressing the same concept with fewer words
- Using verbs rather than nouns
- Choosing the shortest words and expressions
- Avoiding impersonal phrases that begin it is

A frequent result of reducing the overall number of words is that the subject of the sentence tends to be shifted closer to the beginning of the sentence. This means that the reader gets a much quicker picture of the topic of the sentence.

Also, if you use the minimum number of words the importance of what you are saying will stand out more clearly for the reader. These rules in this chapter are designed to help you write in a more concise way. However, it is also important to vary the way you write. It is perfectly acceptable to write a long phrase or sentence, or a complicated construction, provided that you only do this occasionally.

5.3.5 Write:

Your writing will be much clearer if you take into account the following:

- Which is used for adding information about the preceding noun that defines the preceding noun.
- Which, that and who should only refer to the noun immediately preceding them.
- The -ing form (gerund) has no subject. Make sure it is clear what the subject of the -ing form is.
- Clarify whether something is a consequence of doing something or a means to do something by using thus (consequence) and by (means) before the -ing form.
- Use the definite article (the) before a noun only if you refer to a specific example of that noun. If you are giving a generic idea, do not use the article.
- Learn the most frequent uncountable nouns and false friends in your field.

- Be very careful when you use pronouns (this, that, them, it etc.) – make sure it is clear what they refer to and don't be afraid of repeating the same word many times (if this will improve clarity).
- Avoid using the former ... the latter, simply repeat the related noun.
- If necessary, specify exact locations, when using above and below.
- Use respectively when it is not 100% clear how items are related to each other.
- Be careful of punctuation with which and - punctuation must help the reader understand the relationships between the various parts of the sentence.
- Don't confuse both ...and (inclusive) with either ... or (exclusive); and i.e. (definitions) and e.g. (examples)
- Never use synonyms for key words, only for generic verbs and adjectives
- Use the most precise word possible.

5.3.6 Journal:

- Follow the journal's instructions regarding whether you can use we/I or if you have to use the passive at all times.
- You may have the impressions that the passive form is constructed to be more elegant in scientific papers. Whether this impression is true or not, be aware that the passive inevitably creates problems for your readers because it may be difficult for them to know immediately and with certainty whether you or another author made a particular finding.
- Do not rely on a reference to a figure or a table, or a reference to the bibliography to distinguish your new data from those in the literature. Make sure the reference clearly indicates it is another author's work and not a previous paper by you.
- Be aware that if you make mistakes in the usage of tenses when you are comparing your work other authors' work, you could really confuse your readers. Make sure you consistently use the correct tense and remember that in English there is a real difference between the SIMPLE PAST (finished actions with time indications) and the PRESENT PERFECT (past to present actions, finished actions with no time indication)
- Avoid using we when it is not really necessary, i.e. to explain your train of thoughts.
- Help readers to distinguish between your work and others by using a series of short paragraphs, rather than one long paragraph.
- If you mention another author's paper, make sure that the reader understands why you are mentioning that paper and how it relates to your own work.

5.3.7 Layout:

- Be aware of how the layout of your paper can affect where readers focus their eyes - break up long blocks of text using shorter paragraphs and figures/ tables.
- Begin a new paragraph when highlighting something important.
- Use shorter sentences and paragraphs to make your key points.
- Use more dynamic language- make sure the reader understands immediately that you are about to say something important.
- Don't just tell the readers that something is important – show them.
- Tell your readers the implications of your findings.
- Talk about your weaknesses not just your strengths; do not make the referees suspect any bias in your work.

5.3.8 Challenges:

Anticipate possible opposition by your referees and readers by not saying things too assertively or directly.

In practical terms, it is not difficult to insert ‘we believe’ and ‘might’ when describing key findings that could be interpreted in different ways.

And if by using these hedging devices you increase your chances of having your paper accepted in a journal located in the USA or UK, then you should use them!

- Tone down verbs, adjectives, adverbs and your general level of certainty.
- Be aware that the ways you express uncertainty may simply not translate into English.
- Provide alternative interpretations of your data.
- Tell the reader from which standpoint you want them to interpret or judge your data.
- Use impersonal forms to distance yourself when interpreting your findings.
- Save your face by writing in an impersonal fashion.
- Try to put the work of authors in a positive light. If appropriate say their work is open to another interpretation (i.e. yours)
- Don’t over hedge.
- Consider getting help from a native speaker when hedging your claims.

5.4 Questions to Ask:

5.4.1 How can ONE Assess the Quality of Report Title?

- You need to check that your title is:
- In correct English – in terms of syntax, vocabulary, spelling and capitalization
- Understandable (no strings of nouns)
- Eye-catching and dynamic (through effective use of vocabulary and even punctuation's)
- Sufficiently and appropriately specific
- Reflects the content of your paper
- Expressed in a form this is acceptable for a journal
- You can check the syntax and the level of understandability by consulting with a native speaker.
- Generally speaking titles that contain at least one verb and one or more prepositions tend to be much easier to understand
- You can check the vocabulary and spelling using Google Scholar. Remember that an automatic spell check is not enough
- The best way to decide whether it is eye-catching and sufficiently specific is to prepare several titles (including ones in two parts and in the form of a question) with various levels of specificity and ask colleagues to choose their favorite.
- Unless you get someone to read whole paper for you, you are probably the best judge of whether your title reflects the actual content of your paper.
- If it doesn’t the referees will probably tell you.

5.4.2 How can ONE Assess the Quality of Abstract?

To make a self-assessment of your Abstract, you can ask yourself the following questions.

- Have I followed the journal's instructions to authors? Have I followed the right structure (i.e. structured, unstructured) and style (we vs. passive)?
- Have I covered the relevant points from those below?
- Background/context
- Research problem/ aim-the gap I plan to fill
- Methods
- Results
- Implications and / or conclusion
- Have I chosen my keywords carefully so that readers can locate my Abstract?
- Whenever I have given my readers information, will it be 100% clear to them why they are being given this information? (You know why, but they don't)
- Can I make my Abstract less redundant? If I tried to reduce it by 25% would I really lose any key content?
- Have I used tenses correctly? PRESENT SIMPLE (established knowledge), PRESENT PERFECT (past to present background information), PAST SIMPLE (my contribution)

5.4.3 How can ONE Assess the Quality of Introduction Section?

- To make a self-assessment of your introduction, you can ask yourself the following questions.
- Is my research question clear?
- Does my Introduction act as a clear road map for understanding my paper?
- Is it sufficiently different from the Abstract, without any cut and pastes? (Some overlap is fine)
- Have I mentioned only what my readers specifically need to know and what I will subsequently refer to in the Discussion?
- Have I been as concise as possible?
- Have I used tenses correctly? PRESENT SIMPLE (general background context, description of what will be done in the paper), PRESENT PERFECT (past to present solutions), PAST SIMPLE (my contribution, though this may also be expressed using the PRESENT SIMPLE OR FUTURE SIMPLE)

5.4.4 How can ONE Assess the Quality of Literature Review?

To make a self-assessment of your Literature Review, you can ask yourself the following questions.

- Have I mentioned only what my readers specifically need to know and what I will subsequently refer to in the Discussion?
- Are the papers I have mentioned in a logical order? Is it clear why I have chosen these papers and not others?
- Have I selected a disproportionate number of papers from my own country?

- Have I followed my journal's instructions regarding how I make reference to the literature? Where possible have I done this in a variety of ways?
- Have I removed any redundancy when reporting the literature?
- Have I used tenses correctly? PRESENT SIMPLE (descriptions of established scientific fact), PRESENT PERFECT (at the beginning of review to give general overview; for past-to-present evolutions), and PAST SIMPLE (when specific dates are mentioned within a sentence; for the verbs that introduce an author's findings)

5.4.5 How can ONE Assess the Quality of Methodology Section?

To make a self-assessment of your Methods section, you can ask yourself the following questions.

- Have I really described my methods in a way that is easy for readers to follow and which would enable them to replicate my work? Have I ensured that I have covered every step? Is my structure clear and complete?
- Have I been as concise as possible? Have I used references to previous works rather than repeating description that readers could easily find elsewhere?
- Do the individual sentences in each paragraph contain too many, too few, or just the right manageable number of steps? Have I ensured that my sentence don't sound like lists?
- Have I thought about the way readers prefer to receive information? (No ambiguity, no back referencing, everything in chronological order, headings, bullets)?
- Have I checked my grammar (infinitive, gerund, allow, thus etc.) with regard to how I outline how and why I made certain choices?
- Have I checked my journal's guidelines on how to use numbers?
- Have I used tenses correctly? PAST SIMPLE (in the passive from to describe what I did), PRESENT SIMPLE (descriptions of established scientific fact)

5.4.6 How can ONE Assess the Quality of Findings Section?

To make a self-assessment of your Results section, you can ask yourself the following questions.

- Have I expressed myself as clearly as possible, so that the contribution that my results give stands out for the referees and readers?
- Have I limited myself to only reporting the key result or trends that each figure and table conveys, rather than reiterating each value?
- Have I avoided drawing conclusions? (This is only true when the Results is an independent section)
- Have I chosen the best format to present my data (e.g. figure or table)? Have I ensured that this is no redundancy between the various figures and tables?
- Have I ensured that my tables of results are comprehensive in the sense that they do not exclusively include points that prove my point?
- Have I mentioned only what my readers specifically need to know and what I will subsequently refer to in the Discussion?
- Have I mentioned any parts of my methodology (e.g. selection and sampling procedures) that could have affected my results?

- Have I used tenses correctly? PAST SIMPLE for your findings (in the passive form), PRESENT SIMPLE (descriptions of established scientific fact)

5.4.7 How Can ONE Assess the Quality of Report?

When you have finished writing your Discussion, it is a good idea to make sure you can honestly answer 'yes' to all the questions below. This will enable your peers to make a critical assessment with regard to the strengths and weaknesses of (a) how you carried out your research (b) and how you analysed your findings. The result will be that you will be seen as a credible researcher.

- Is my contribution to the knowledge gap clear? Have I underlined the significance of my findings?
- Have I explained what I believe to be new and important very clearly but without exaggerating? Have I ensured that I have not over-interpreted my results (i.e. attributed interpretations to them that cannot actually be supported)?
- Have I truly interpreted my result, rather than just reiterating them? Have I shown the relationship (confirmation or rejection) between my results and my original hypothesis? Have I generated new theory rather than simply giving descriptions?
- Is there a good balance, rather than being a one-sided version? Have I really offered alternative explanations?
- Have I clearly distinguished fact from speculation? Will the reader easily be able to understand when I am merely suggesting a possible interpretation rather than providing conclusive evidence for something?
- Have I ensured that there is no bias in my research? (i.e., I have not hidden any of my data or any unexpected results, simply because they do not confirm what I hoping to find)
- Have I included those works in the literature that do not corroborate my findings? Likewise, have I avoided distorting the magnitude or direction of the data of the literature that I have selected? (I.e. I have made sure that I have not committed publication bias)
- Have I discussed my findings in the context of what I said in the introduction? Have I exploited my Review of the Literature?
- Have I integrated my results with previous research (including my own) in order to explain what I observed or found?
- Have my criticisms of the literature been justified and constructive?
- Have I ensured that I have not introduced any new findings (i.e., findings not mentioned in the results)?
- Are all the statement I have made in the text supported be the data contained in my figures and tables?
- Have I removed any trivial information? Have I been as concise as possible?

5.4.8 How can ONE assess the quality Conclusions Section?

To make a self-assessment of your Conclusions, you can ask yourself the following questions

- Is what I have written really a Conclusions section? (If it is more than 200-250 words, then it probably isn't – it needs to be much shorter)

- If the conclusions are included in the Discussion, have I clearly signaled to reader that I am about to discuss my conclusions (e.g. by writing in conclusion...)?
- Have I given a maximum of one line to comments related to descriptions of procedures, methodology, interviews etc.? (Generally such comments are not needed at all, unless the primary topic of your paper is the methodology itself)
- Have I avoided cut and pastes from earlier sections? Do my conclusions differ appropriately from my Abstract, introduction and final paragraph of my Discussion?
- Are my Conclusions interesting and relevant?
- Have I given my Conclusions as much impact as possible and have I avoided any redundant expressions?
- Have I avoided any unqualified statement and conclusions that are not completely supported?
- Is my work as complete as I say it is (i.e. I am not trying to get priority over other authors by claiming inferences that cannot really be drawn at this stage)
- Have I introduced new avenues of potential study or explained the potential impact of my conclusions? Have I ensured that I have only briefly described these future avenues rather than getting lost of detail?
- Are the possible applications I have suggested really feasible? Are my recommendations appropriate?
- Have I used tenses correctly? PRESENT PERFECT (to describe what you have done during the writing process), PAST SIMPLE (what you did in the lab, in the field, in your surveys etc.

5.5 Conclusion:

Report writing is quite formal in nature and the writer should plan effectively by consulting, using acceptable language, keeping readers in mind, editing unnecessary words and statements and doing proof reading before submitting the concerned authority.

Writer should keep in mind and answer the questions related to title, literature review, methodology, findings and conclusions clearly before submitting the research report to the journal for publication.

5.6 References:

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