

MSc Research Skills

Topic: Technical English

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Topic: Technical English

An ITC thesis must be written in the (European) English language.

This is simpler than writing literature:

Scientific communication should be **clear**, **direct**, **unambiguous** and **forceful**

For most scientific authors (especially non-native speakers) this means:

- Don't try to be literary or clever;
- Use **simple direct language**;
- Write just enough to clearly make your argument, no more.

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How to be creative?

- Two contrasting writing methods:

- * Write as fast as possible, correct later; or
- * Write carefully, don't leave any problems.

Match the style to the author's personality.

- Author's tips:

- * Keep an **author's notebook** with you
- * Find the **time of day / days of week** when you are most creative
- * Other times for **routine tasks** (e.g. spell-checking, proofreading)

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Write for your audience

Consider:

- **technical** level (specialist vocabulary, how much you need to explain)
- **social** level (formal vs. informal, peer-to-peer or hierarchical)
- **language** level (e.g. comprehension of complex grammar)

Question; What is the audience for an ITC MSc thesis?

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Revising and re-writing

All good authors **revise** and **re-write** extensively.

Read your own work **as if you did not know it** and from the **point of view of your intended audience**.

- Does it say what you **intended**?
- Are all the points **clear** and **unambiguous**?
- Is it at the **right technical level** for your intended reader?
- Is it at the **right language level** (style, vocabulary) for your intended reader?

Do this **several times**. Maybe you can ask a friend to review it? (Will s/he still be your friend afterwards?)

Some matters of style

- **Shorter** is (usually) better, but don't sacrifice length for **clarity**
- Use **connectives** to help the argument flow
 - * "However", "On the other hand", "Surprisingly", "In addition" ...
- Use a **dictionary** and **style manual** when in doubt
- Use a **spelling and grammar checker**, but use your head also:
 - * Watch out for homonyms: e.g. "bear" vs. "bare"
 - * Watch out for correctly-spelled word but not the intended meaning

(continued ...)

Style (2/3)

- Pick the right word, avoid barbarisms (e.g. "to impact")

- **Omit needless words**

WRONG: 'The results show that after computing the correlation matrix between the NIR and IR bands the correlation was found to be 0.95 for the LANDSAT TM7 images and 0.96 for the ASTER images.'

RIGHT: 'The NIR and IR bands were highly correlated (LANDSAT TM7 $r = 0.95$, ASTER $r = 0.96$).'

WRONG: 'We interviewed ten local farmers. Local farmers said that ...'

RIGHT: 'We interviewed ten local farmers, who said that ...'

WRONG: 'As a result of the field measurements, it could be observed that the average steady-state infiltration rate of the soils was 1.2 cm hr⁻¹'

RIGHT: 'The average steady-state infiltration rate was 1.2 cm hr⁻¹.'

Style (3/3)

- Make sure references to agents are correct

WRONG: 'Arriving at the field site, the plots were observed to be heavily eroded.'

RIGHT: 'Upon arriving at the field site, we observed heavy erosion in the plots.'

- Avoid adjectival noun clusters

AWKWARD: 'We examined the user data source information communication requirement.'

SMOOTH: 'We examined the user's requirement for communication of information on data sources.'

Verbs: tense

Tense: The time to which the verb refers.

Place yourself in the position of the **reader** and consider the time to which the statement refers **at the time it is written**.

- **Future:** For events still in the future when the document was written.

'Fifty plots **will be** sampled.'

Also for speculative statements about the future:

'Sub-pixel classification **will become** a routine technique for forest inventory.'

Tenses (2/3)

- **Past:** For events already in the past when the document was written.

'Fifty plots **were** sampled.'

It is also used for specific (one-time) results in the past (e.g. of a study)

'Ground control with single-receiver GPS survey **was** able to adequately rectify 1:5 000 scale small-format aerial photography to map accuracy standards.'

- **Present:** For statements that are **always true** for some continuing time period.

'Sub-pixel classification **is** a new technique for forest inventory.'

Note: This statement may be false some years from now, but it's true at the time of writing and for some time thereafter.

It is also used for a **general** statement that is widely-applicable.

'Ground control with single-receiver GPS survey **is** adequate to rectify 1:5 000 scale small-format aerial photography to map accuracy standards.'

Tenses (3/3)

- **Past perfect:** For events already in the past when another event in the past occurred.

'Fifty plots **had been** sampled as part of a previous project.'

This implies a context such as "...when we decided how many more plots to sample."

- **Future perfect:** For future events that **will have been completed** when another event in the future occurs.

'Fifty plots **will have been** sampled by this project.'

This implies a context such as "...before we arrive to sample our plots."

Verbs: voice

Voice: **Active** and **passive**.

Active:

'Pests damage crops.'

'Over-fertilization damages crops.'

'The experimenter damaged the crop.'

'I damaged the crop.'

Passive:

'Crops are damaged by pests.'

'Crops are damaged in the spring.'

'The crop was damaged by the experimenter' (me!)

When to use passive voice?

When the **object** is more important than the **subject**, or if the subject is irrelevant:

‘The wheat crop was damaged in the spring.’

But the subject can be mentioned:

‘The wheat crop was damaged in the spring by over-fertilization.’

It’s implied that the farmer was responsible for over-fertilization, but maybe not:

‘The wheat crop was damaged in the spring by the excessive amounts of fertilizer applied as part of the experiment.’

When to use the active voice?

To make it clear who did what (Webster, European Journal of Soil Science 54:215):

- **assumption**: ‘It is assumed that’: who does?
 - * ‘We assume that ...’ or ‘The previous survey assumed that ...’
- **decision**: ‘It was decided to’: who decided?
 - * ‘The authors decided to ...’ or ‘The local government authority decided to ...’
- **choice**: ‘Sites were chosen’: who chose?
 - * ‘An experienced soil surveyor chose the sites’ or ‘The local extension agent directed us to cooperative farmers, who were convinced by the agent to allow use of a small portion of their fields, of the farmers’ choosing’.

Avoiding egotism with the active voice

Repeated use of “I” is often jarring to the reader. Some ways to avoid:

- Use “We” if more than one author; this sounds much less egotistical
- Use “The author”
- Introduce a paragraph with the active voice, write the rest in the passive:

“**We** designed this study to avoid bias. Sites were chosen so that ... Care was taken in sampling ... Samples were placed immediately in a thermally-isolated container ...”

Punctuation

Punctuation is used to **break words into groups** with a related function, so that it is easier for the reader to understand the intent of the author, and to mark emphasis or question.

- full stop or period (“.”)
- semi-colon (“,”)
- colon (“:”)
- comma (“,”): different styles by region
- exclamation point (“!”): rare in scientific writing
- question mark (“?”)

For non-native speakers

- Recommend: a **learner's English-English dictionary**
 - e.g. the Oxford Advanced Learner's Dictionary
- A **bilingual dictionary** can help find phrases and vocabulary; however be aware of **usage** and **shades of meaning**
 - e.g. English 'to bear' = Spanish 'sostener', 'dar', 'producir', 'llevar', 'tener', 'sportar', 'odiar', 'parir', 'resistir' ...
- Don't write in your native language and translate; **think in English**. This avoids non-English sentence constructions.
- Machine translation** can help with phrases and vocabulary, but never with writing smooth and clear prose.

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Final thoughts

- Good writing is **difficult**, but
- Good writing is the only way to **communicate** your scientific work to your audience.