NOTTINGHAM TRENT UNIVERSITY

Academic Writing for Sciences

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The Principles of Academic Writing

Take a class of writing students in a liberal arts college and assign them to write about some aspect of science, and a pitiful moan will go around the room. "No! Not science!" the moan says. The students have a common affliction: fear of science. They were told at an early age by a chemistry or a physics teacher that they don't have "a head for science."

Take an adult chemist or physicist or engineer and ask him or her to write a report, and you'll see something close to panic. "No! Don't make us write!" they say. They also have a common affliction: fear of writing. They were told at an early age by an English teacher that they don't have "a gift for words."

Zinsser, W. (2006). On Writing Well. Harper-Collins.

What makes good writing?

- Good writing is elegant and stylish (???)
- Academic writing must be produced in the "formal style" (What does it mean exactly?)

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Good writing communicates an idea clearly and effectively.

What makes a good writer?

- Having something to say
- Logical thinking
- Some learnable rules of style
- Complex ideas don’t require complex language.
- Academic writing should be easy (reader-friendly) and even enjoyable to read!

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Believe it: Good writing can be learnt! Take home this message.

Don’t procrastinate and start writing!

Writing for (natural)sciences.

- Who is your audience?
- fellow scientists
- policy makers
- broad audience (laymen)

Why is it important to define your audience?

- People are under no obligation to read your paper. Only half of readers will finish an article and if an article is published online only a fifth of the readers will finish reading it (Wallwork, 2011).
- Readers are generally pressed for time and not always committed to reading.
- Make your writing reader friendly, don't force your readers to wait for the significant information for too long-they might abandon your paper.

Who is the audience in these sentences? What are the differences between them?

1a Thermal systems is a very broad term involving many separate field of engineering.

1b Thermal systems is an interdisciplinary field which involves the traditional disciplines of thermodynamics, heat transfer, fluid mechanics, mass transfer and chemical kinetics.

Feak, C. and Swales, J. (2012). Academic Writing for Graduate Students: Essential Skills and Tasks.

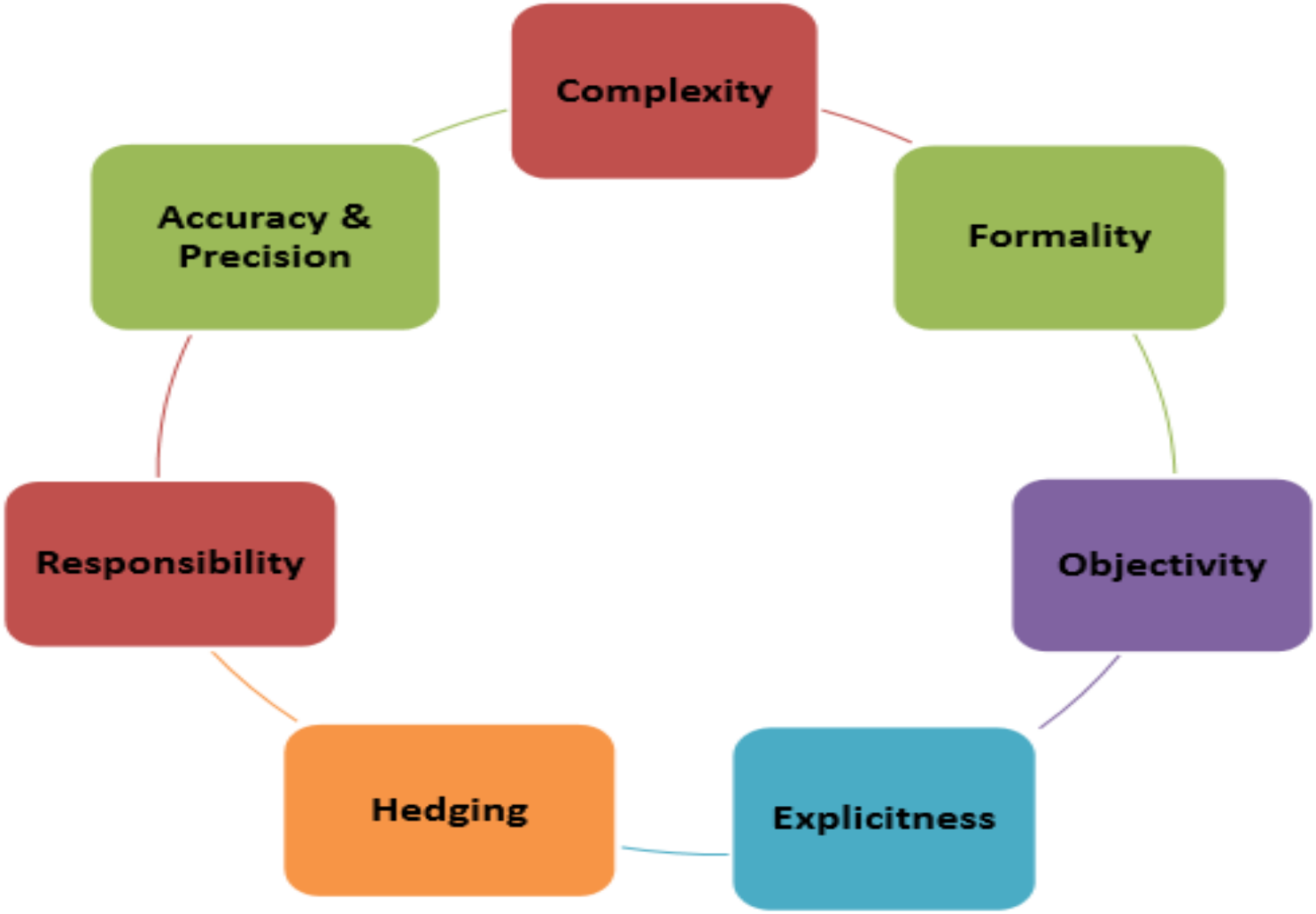
Complete the sentences

- If the audience knows less than you, when you write you should……..

- If the audience knows more than you, when you write you should…….

Feak, C. and Swales, J. (2012). Academic Writing for Graduate Students: Essential Skills and Tasks.

What do these words mean in regard to academic writing?



Complexity

Academic writing is more complex than 'everyday' writing in two main aspects:

It is lexically more dense (meaning more words: mostly nouns).

However, is this sentence easy to read? What do you think makes it difficult to process it?

"These findings imply that the rates of ascorbate radical production and its recycling via dehydroascorbate reductatse to replenish the ascorbate pool are equivalent at the lower irradiance with the rate of ascorbate radical production exceeding its recycling back to ascorbate."

However, is this sentence easy to read? What do you think makes it difficult to process it?

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How about this one?

"These finding imply that, at low irridation, ascorbate radicals are produced and recycled at the same rate, but at high irradation, they are produced faster than they can be recycled back to ascorbate."

What makes it more reader-friendly?

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Sometimes academics seem to try to "blind you with science" for nor reason. What do you think it means?

Subjects were tested under conditions of good to excellent acoustic isolation.

We tested the students in a quiet room

When you write about complex ideas, there is no need to use overly complex language.

After all, your readers read the paper for its content and not its linguistic sophistication.

Formality

Avoid informal vocabulary.

Can you think of examples of informal vocabulary that should be avoided in academic writing?

Colloquial or slang vocabulary: – kids, huge, quid

Contractions: – don’t, can’t

Idioms or proverbs – ‘every coin has two sides’, ‘a hot topic’

Responsibility

Provide evidence

Justify your claims

There are two essential ways to acknowledge the source:

- In-text reference/citation
- References (full source information at the end of the assignment)

In-text reference/citation

(60) Jofuku and Goldberg (1989) showed the expression of several Kunitz protease inhibitors in soybean tissue. (D2:266)

(61) Jofuku et al [1989] deduced that an N-terminal signal sequence.. (D2:264)

(62) Sandal et al (1987) and Metz et al (1988) have suggested that ... (D1:637)

References (full source information at the end of the assignment)

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Explicitness

UK academic writing is linear in organisation:

Introduction: Outline what's to come & Thesis statement

Body: Topic sentence for each paragraph; support with examples & evidence

Conclusion: Refer back to introduction; review the main message

Objectivity

Which of the two sentences is more objective and why?

a. Everybody knows about the threat of global warming to our earth. We all pollute the atmosphere with gases and we all throw away rubbish that could be recycled. As far as I am concerned, these are two aspects that can be improved.

b. The threat of global warming to the earth has generally been established. Gases pollute the atmosphere and waste that could be recycled is sent to landfill. There seem to be two main ways in which pollution can be combatted.

Accuracy and Precision

Use vocabulary accurately. What's (potentially) wrong with this sentence?

The purpose of this assignment is to analyse how good hydrogen is a fuel.

Facts and figures need to be written precisely:

The amount of CO2 in the atmosphere is at about 400 parts per million.

What does about 400 parts per million mean?

Hedging

What is the difference in the way the writer presents his/her stance?

1a By overcoming the stigmas associated with cycling helmets, it may be possible to increase their use by the general public.

1b By overcoming the stigmas associated with cycling helmets, it will be possible to increase their use by the general public.

(82) Taken together, these data suggest that the protein synthesis in plants is not regulated by phosphorylation of EF-2. Nevertheless, it cannot be excluded that this mechanism is realised only at certain phases of plant development (for instance during gametogenesis) and such a possibility requires further study. (B3:222)

Examples of hedges in scientific writing

(83) It appears that the transformation of active reaction centres into quenching centres is partly reversible if ..... (A3:9)

(84) This would probably suggest that the C-terminal processing is not achieved in the nodules, but this needs to be demonstrated. (D2:265)

(85) Presumably some 'signal' generated in the choloroplasts initiates a sequence of events that lead to phosphorylation or dephosphorylation of PEPc in the cytosol. (C1:190)

(86) We speculate that the inhibtor interacts specifically with a protease, the origin of which is still to be determined... (D2:267)

Hayland, K. (1996). Talking to the academy: forms of hedging in science research articles. *Written Communication* 3: 251-281.

- Why is tentative language sometimes used in scientific writing?

Scientists use hedges…

1. To avoid absolute statements
2. To distance themselves when the subject is controversial
3. To distance themselves from the evidence if it is well-respected in the field and they want to disagree with it
4. To distance themselves from the evidence if it doesn’t have consistent support in the field

Part Two: Writing Academic Essays

Paragraph Building

- How many ideas should you communicate in one paragraph?
- 1 paragraph = 1 (main) idea. Think in paragraphs when you write.
- How long should paragraphs be?
- Keep your paragraphs relatively short.

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- The punch line to catch the readers' attention should be early.
- The ideas should be joined/followed logically with, if necessary, transition words (*furthermore*, *however*, *firstly*, *secondly*, *lastly*) but don't overuse them and you really don't need fancy transition words.
- The first and last sentences of a paragraph are remembered best, make sure your last sentence is memorable.

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How can you organise your ideas in a paragraph?

- Sequential in time
- General-specific
- Logical arrangement (if a then b; if b then c; if a therefore b, etc.)

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Scientists tend to think in the following way:

- Details, details, data, supporting data, conclusion.
- However, when you write, try to reverse this process:
- Give away the punch line/conclusions first and then fill it in with other details. Then the readers will not need to weed through all of these details before they learn where you're going.

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- Start your paragraphs with a topic sentence or a general idea of the paragraph.

  Sometimes topic sentences might be too confining if you have to start each paragraph with the exact statement of the aim of the paragraph.

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What do you need to know before you start writing your essay?

Before you start writing your essay, make sure you:

- understand the question/topic
- have topic knowledge (content)
- be able to focus your answer (essay)
- be able to organise your answer (essay)
- be able to write your answer (essay) in accurate language

Quiz. Choose the correct answer:

You will now be given possible instruction words in exam questions (and coursework topics). Choose the correct answer A or B

outline

A. break down into elements and show relationships among them

B. divide into aspects/elements and consider each in detail

discuss

A. give a detailed account of a subject

B. explain the topic briefly and in a clear manner

illustrate

A. propose changes/solutions to a subject and justify them with relevant support and prediction

B. look at various aspects of a subject, compare & contrast, show benefits and drawbacks

The structure of the essay is fairly standardised:

Introduction: Outline what's to come & Thesis statement

Body: Topic sentence for each paragraph; support with examples & evidence

Conclusion: Refer back to introduction; review the main message

Before you submit your essay…have a reflection. You are able to correct yourself some of the mistakes you have made.

Look at the assessment grid from your course and make a list of self-check questions you can ask yourself based on the criteria in this assessment grid, e.g.

Content (60%) Exceptional knowledge and understanding of the topic. Considers /relates all relevant information, beyond expectation. Conclusion is insightful and persuasive.

Possible questions…

Is the content of my essay in depth or superfluous? Which facts should be described in more detail? How are ideas in my essay linked to the statement of the purpose of the essay? How does my essay end? Has the question in the title been answered? Is my conclusion insightful enough?

Assessment Grid: First.

Excellent written work in a concise scientific style, very few or no errors

Excellent, clear structure and attractive presentation.

Excellent figures support points.

Before you submit your essay…

My writing teacher used to say:

"Make sure your writing is worth the paper it's been written on…"

This might sound cruel (or sounds cruel?) but there are some mistakes in our essay we can improve ourselves.

Have a look at this check list. Ask yourself these questions and look for the answers in your essay.

Check List

What are the key sections of the essay?

What makes them distinguishable?

What language indicates the beginnings of new ‘sections’?

How are ideas in the essay linked to the statement of the purpose of the essay (in the introduction)?

- How is the information organised? – Which section mentions what?
- How does each (body) paragraph begin? Does it begin with a topic sentence or the main idea?
- How are sentences within each (body) paragraph connected? Are the ideas/arguments logically connected?

Can you think of any other questions?

- What tenses dominate the essay and in which section are they used? Are they used appropriately?
- Are the articles/prepositions correctly used?
- Are the verb forms correct? Is there a subject-verb agreement?
- How are citations used in different sections: integral - as part of the discussion (with a reporting verb) or non-integral (with authors' names in brackets)? Are there any sections unreferenced?
- Does the essay use any informal language including personal pronouns?

- How does the essay end? Has the question in the title answered?
- Is the tone of the essay subjective or objective?
- Does the essay need hedges or are only unequivocal facts presented?
- Is the language of the essay objective?
- Is the content of the essay in depth or superfluous? Which facts should be described in more detail?
- Are all the tables/charts numbered and described?
- Does the essay need to have subheadings?
- Is the list of reference written in the appropriate way?

Task

Analyse the assessment grid from your course. Can you assess the following two essays and explain your grade based on the grid?

Last but not least…

How can I improve my academic writing?

- Know the rules of academic writing and adhere to them! At first, it might sound daunting but later it will become repeticious.
- Read, pay attention (also to the genre), and imitate.
- Write in a journal.
- Talk about your research before trying to write about it.
- Write to engage your readers—try not to bore them!
- Stop waiting for "inspiration." Academic writing is a skill that you can learn. You don't need to be a native speaker of English or have an inborn talent to write well.
- Accept that writing is hard for everyone. Even experts have to improve their work.
- Revise. Nobody gets it perfect on the first try. If professionals have to do it, what makes you think you don't need it?
- Learn how to cut your words/content ruthlessly. Never become too attached to your words. It's not easy but it's a natural process of editing/improving your work.
- Try to edit your own work! There are many problems you can spot yourself without waiting for your lecturer to do so.

- Take risks. After all, we all learn for trial and error ☺

Thank you for your attention.

For extra support come to our language tutorials ☺

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