

WRITING IN SCIENCE

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WRITING IN SCIENCE:

CLARITY AND PRECISION IN COMMUNICATION FOR A WIDE VARIETY OF PURPOSES

With supplementary material:

Responding to Reviewers' Comments on
Manuscripts Submitted for Publication

CLARITY AND PRECISION

- **The fat cat sat on the red mat**
- This is a clear and precise statement
- Clear: because the reader easily understands what is being communicated
- Precise: because relevant descriptors of both the cat and the mat are stated.....
- The fat cat sat on the red mat
 - (i) *Irrelevant details are omitted;*
 - (ii) *Concise statement, minimal number of words*

The same idea.....

but neither clear nor precise

In a large spacious room, a well-fed very obese member of the feline species with enormous whiskers reclined gracefully in a seated posture on a Persian carpet woven by skilled hands into a beautiful scarlet and crimson pattern, creating a vista of peace and harmony that could quell the passions of even the most excited observer.

(56 words)

Contrast with the 8-word statement in the clear and precise version !

A sense of purpose, at all times!

In order to achieve clarity and precision, for all forms of scientific writing, the writer (himself or herself) needs to start knowing the following:

- The purpose of the written work
- The audience for whom the article is intended
- **The facts and ideas thought through, clearly and logically (*i.e. the basic components of the scientific argument to be applied*)**
- The format of the written work
- The style of language to be adopted

The Basic Scientific Argument

- Proposition
- Evidence
- Evaluation
- Conclusion

The Scientific Argument

- Proposition:
Fat cats prefer to sit on red mats
- Evidence:
Surveys of feline behaviour in terms of where cats of different body shapes spend their time sitting, and over what periods of time they spend on mats of different colours, at various times of day or night
- Evaluation:
How strong is the evidence and does it support the proposition, or not (*or maybe in a qualified manner*)?
- Conclusion (*might be, depending on evidence*):
Fat cats prefer sitting on red mats, but only at night

The Scientific Argument in Writing

The scientific argument provides a basic structure for writing by scientists in many different contexts

- PhD theses (and dissertations for other degrees)
- Primary research papers
- Scientific review articles
- Editorial or “news and views” articles

In these examples, the author(s) are responsible for evaluating data and making the conclusions

Primary research papers

- Title
 - Summary (or Abstract)
 - Introduction
 - Materials and Methods
 - Results
 - Discussion
 - Acknowledgements
 - References
- Proposition
 - Evidence
 - Evaluation
 - Conclusion

Two further features of research articles

- **In the Introduction** you must make clear why the work is significant or of interest.....
(this is needed to attract the readers' attention or to make sure they keep reading!)
- **In the Discussion** you must set out what is now known from this research that was not known before...
(this is the take-home message of the article and is needed to leave the reader satisfied)
- Both these aspects need to be covered briefly in the **Abstract**, in order to make this summary most effective.

Review articles

- Title
 - Summary (or Abstract)
 - The development or progress of a research field or conjunction between fields is presented as narrative text (with subheadings)
 - Acknowledgements
 - References
- Proposition
 - Evidence
 - Evaluation
 - Conclusion

Editorial or “News and Views” articles

- Title
 - A significant new finding is highlighted as narrative text (possibly with subheadings) and put into a suitable context
 - (*Acknowledgements?*)
 - References
- Proposition
 - Evidence
 - Evaluation
 - Conclusion

Open and closed communications

Open (*published in print, electronic or oral*)

- Research manuscripts
- Reviews
- Editorials

Closed (*often need to be confidential*)

- Reviews of submitted manuscripts
- Assessment of grant/fellowship applications
- References for others making applications

Reviewing a submitted manuscript

- What are authors claiming?
- Is the approach valid?
- Are the techniques sound?
- Are the data substantial?
- Are the data interpreted well?
- Do the results bear on the proposition put by the authors?
- Are the conclusions valid?
- Is this a worthwhile contribution to the literature?

- Proposition
- Evidence
- Evaluation
- Conclusion

Reviewing a manuscript (*continued*)

Now is your big chance to show you have learnt the lessons of clarity and precision in writing!

- Is the writing style clear?
- Are the expressions precise?
- Is the English up to standard?

- Proposition
- Evidence
- Evaluation
- Conclusion

This is more about presentation than content, but the basic scientific argument still applies !

Assessing a grant application

- What significant problems are the applicants seeking to solve?
 - Are the aims justifiable?
 - Is the approach valid?
 - Are the techniques sound?
 - Will the data be substantial?
 - Are the results to be obtained relevant to the propositions put by the applicants?
 - Will this be a worthwhile contribution to science and/or technology?
- Proposition
 - Evidence
 - Evaluation
 - Here the “conclusions” are drawn by the panel, not by the assessor

Assessing a grant (*continued*)

- Can the applicants (and their wider network of collaborators) really carry the proposed work?
 - Do they have (or can they get) the requisite expertise?
 - Have they got relevant experience?
 - How strong is the published track record of the applicants?
 - Have the applicants got a strong record of previous grants with good outcomes?
- Proposition
 - Evidence
 - Evaluation
 - Here the “conclusions” are drawn by the panel, not by the assessor

Writing a grant application

- What significant problems are **you** seeking to solve?
- Are **your** aims justifiable?
- Is **your** approach valid?
- Are **your** techniques sound?
- Will **your** data be substantial?
- Are **your** results to be obtained relevant to the propositions put by **you**?
- Will **you** make a worthwhile contribution to science and/or technology?

- Proposition
- Evidence
- Evaluation
- *Here you try to enable the assessors and panel to draw "conclusions" that you desire*

Writing a grant (*continued*)

- Can **you** (and your wider network of collaborators) really carry the proposed work?
- Do **you** have (or can **you** get) the requisite expertise?
- Have **you** got relevant experience?
- How strong is **your** published track record?
- Do **you** (and **your** collaborators) have a strong record of previous grants with good outcomes?

- Proposition
- Evidence
- Evaluation
- *Here you try to enable the assessors and the panel to draw "conclusions" that you desire*

The Basic Scientific Argument applies to many other writing tasks

- Grant applications
- Applications for Fellowships
- Applications for Jobs
- Proposals for Promotion
- Nominations for Awards
- Submissions to Panels or Enquiries
- References for Others

- Proposition
- Evidence
- Evaluation
- *Conclusions*
-

Essentially anything that has a scientific or technical content.....

Targeted writing to the desired audience

Honing the Basic Scientific Argument in all your writing tasks

- Place yourself in the mind of the intended audience to get the tone and content right
- Read over what you have written and make sure it is all clear and precise
- Make sure the intended audience will be drawn to the conclusions that you desire
- Get a colleague to read it to get a fresh view
- Be responsive to advice of mentors and peers
- Learn from mistakes..... ***We all make them!***

SUPPLEMENTARY MATERIAL

Responding to Reviewers' Comments on Manuscripts Submitted for Publication

Responding to Reviewers' comments on Manuscripts submitted for publication - 1

- Keep a cool head – do not let adrenalin guide your reactions!
- Do not respond immediately - deal with comments rationally and purposefully
- Before drafting the response, allow the initial emotion of feeling criticised, and possibly belittled, to subside.
- Talk to your co-authors (and calm them down, if necessary!)
- Wait 24 hours, then re-read the reviews on a new day, when you have had time to “sleep on it”.

Responding to Reviewers' comments on Manuscripts submitted for publication - 2

- Read the Comments very carefully and be sure you understand what the Editor and Reviewers are stating
- Reviewers' Comments guide the Editor's decision on whether to publish your manuscript, probably in a revised form (*very few manuscripts are unchanged!*)
- Reviewers' Comments are a valid "mirror" on your submitted manuscript and often reflect what the general reader may feel about the manuscript (*you may not have realised how others see your work or appreciate the way you have presented your material*)
- Reviewers are often being constructive (*but you may not realise it at first*)

Responding to Reviewers' comments on Manuscripts submitted for publication - 3

- Mark the Comments according to their impact:
 - - YES, agree – you do need to fix this
 - - NO, disagree – you must develop a clear argument for not changing it
 - - PENDING, you may need to get more information or consult someone to get further input before deciding how to proceed
- Once you have your points clarified, draft a response – this can be as important as the original manuscript, so you need to devote much time and attention to this

Responding to Reviewers' comments on Manuscripts submitted for publication - 4

- Remember that the response is directed to the Editor (*i.e. you communicate with the Reviewers through the Editor; your formal response will be sent to Reviewers*)
- Respond to every Comment, from both the Editor and from each of the Reviewers, point by point
- Follow the numbered points that Reviewers often use – if not, you can number the Comments yourself!
- When responding to particular points, show the quoted Comment in italics and write your response underneath – the Editor and Reviewers can thus see what you are responding to.

Responding to Reviewers' comments on Manuscripts submitted for publication - 5

- “Pick your battles” – you do not have to win every point of argument in all details.
- Choose what to change in response to Comments of Editor and Reviewer
- Give way on minor points (*remember you are trying to get the manuscript published*)
- Argue firmly on major points that you feel are not correct or suggestions that are impractical to implement
- Use the Scientific Argument at all times (*i.e. your propositions must be supported by evidence*)

Responding to Reviewers' comments on Manuscripts submitted for publication - 6

- Consider carefully suggestions made by Editor or Reviewers for more experiments
- Sometimes they are controls that you should have done anyway!
- Other times they may be suggestions for additional work that would reinforce a point you are trying to make (*but perhaps you have done the same thing in another way, or someone else has obtained evidence on this point that you could cite*)
- If the suggested work goes beyond the scope of your contribution, say so - indicate what is for future work!

Enjoy your writing!

**It is your best and most
enduring means of
broadcast to the world**

